Norway and Russia agree to a Barents Sea 'grey zone'

NORWAY and the Soviet Union have at last reached agreement over the so-called "grey zone" in the Barents Sea. It was signed in Oslo on January 11 by Norway's Law of the Sea Minister Jens Evensen and Soviet Fisheries Minister Alexander Ishkov.

Negotiated by Mr. Evensen in Moscow last year, the agreement has been criticised in Norway. It is contended that the Soviet sector principle takes away waters that would be Norwegian under a median line principle.

Disagreement over this issue led to the creation of a grey zone, which is a triangular area of almost 70,000 sq. km. bounded on one side by a sector line and on the other by a median line.

Under the present arrangement, the grey zone has been pushed west into Norwegian waters. But, despite protests, Norwegian fishermen urged acceptance so that fishing could proceed.

The arrangement provides for a catch by Norwegian vessels of 30,000 tons of cod and 5,000 tons of haddock in the Soviet sector.

Soviet ships are allowed 80,000 tons of cod and 10,000 tons of haddock in the Norwegian sector.

And their saithe quota in the Norwegian zone south of the 62nd parallel has been cut from 50,000 to 40,000 tons.

The agreement is temporary and Jens Evensen is planning to visit Moscow in March for more talks.

At another meeting in January, the USSR and Norway began talks on the allocation of catches to third countries.

The quota available is 130,000 metric tons and 20,000 tons is in the grey zone.

'FISH AND GET RICH' IN MALTA

THE Prime Minister of Malta, Mr. Dom Mintoff, last month announced the setting up of a co-operative in colluboration with Libya.

It will be a joint venture between the two countries called *Stad u Staghna* (Fish and Get Rich).

About ten trawlers will be used. They will be built in Malta and will operate in Maltese and Libyan waters. Malta's present yearly catch of about 1,500 tons represents only about 0.2 per cent of the Mediterranean total.

India lake projects costs £2m

THE Indian east coast state of Orissa has two schemes for developing fisheries in and around Chilka Lake, the largest freshwater expanse in the country.

Cost of the projects will be around Chilka Lake, the They will be carried out by the Chilka Lake Development Authority, to be set up by the state government.

One of the projects will develop fisheries in brackish water. The other aims at exploiting the offshore and deepsea fishing potential in the coastal area adjoining the lake. A fishing harbour will be built near the lake.

The projects are being given top priority because they are needed to improve living conditions of some 60,000 fishermen in 114 villages in the lake area.

DEEPSEA FISHING— TAX FREE

"THE GOVERNMENT will grant an enhanced subsidy of 50 per cent. to those who buy fishing vessels, and will grant a tax holiday to those who take to deepsea fishing," said Sri Lanka's Minister of Fisheries, Mr. Festus Perera, recently.

He hoped the concessions would stimulate development of the country's fishing industry. The stage was set for a change in emphasis from coastal to off-shore and deepsea operations.

Sri Lanka's export trade in marine products had been growing in recent years.

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CONCORD TRAWLER FROM COSAVI

$75m 'CATCH'

THE United States tuna fleet is expanding again. In six months the Campbell Industries yard in San Diego, California, has taken orders for 15 big purse seiners worth $75 million. And, as we went to press, the yard revealed that another two had been added.

Of the 17 vessels, ten will be delivered in 1978; the other seven next year. Fourteen of the ships are the Campbell yard's standard 1200 tonners. Three will be 1700-tonners priced at more than $7 million each.

There are still dark clouds on the tuna fleet's horizon. The porpoise problem is not finally solved, and Mexico is threatening to pull several countries into her own version of a tuna commission.

But the industry is beginning to get the new ships it badly needs to replace seiners transferred to other flags, and to meet the demand for tuna estimated to be rising at about 15 per cent a year.

Things are no longer quiet or depressed in San Diego or in the busy yard of Campbell Industries.

See full report on Page 26.

Order for seventeen tuna ships

RED KINGS!

Russian fisherman Valeri Alexeyev with two king crabs from a catch taken by his ship the Sea of Okhotsk. The Russian harvest of king crabs off the Soviet Far East is about 20,000 tons a year. This is one fishery not hit by spreading limits. For an account of how the Soviet Union is adjusting to 200-mile limit regimes, see page 32.

Norway's cod runs but Capelin limps

NORWAY'S famous winter cod fishery around the Lofoten Islands is heading for its best season since 1972. Then, an earlier big year-class reached its peak and the spawning run of skrei yielded a 93,000-ton catch.

The 1977 season is also at the high-point of the growth of another good year class. And the catch from this fish could reach 70,000 tons, 25 per cent up on 1977.

But Per Magnar Arnstad, director of the Norwegian Fish Producers' Association, fears processors will not get the benefits of the big run.

"There are many to share the cake," he said. "The fishermen's share is the biggest and the processors' the smallest."

Cod processing — chiefly salting and drying — is concentrated in the period January-April. According to Arnstad, the 5,000 to 6,000 workers are among the lowest paid in Norway earning a basic of about £2 an hour.

While a shore worker may earn up to 25,000 kroner in the season, the fishermen may get 100,000 kroner (almost £10,000).

Profit margins are minimal, says processor Bjarne Fugertun of Vaerøy. "I pay about five million kroner for 1,000 tons of cod. When processed these fish may fetch 5.4 m. kroner. And out of the 400,000 kroner I have to pay my workers and overheads."

His plant exports 99 per cent of its production — salted or dried — to Italy and Portugal. Only one per cent goes to Oslo for sale in the fresh fish shops.

Gutting cod on the Lofoten Islands — a big year but not for stockfish.

Bad start

Norway's other big winter fishery, that for capelin, started badly this year after its record performance in 1977.

By mid-February, the catch was only 160,000 tons, compared with 450,000 tons at the same time in 1977.

This was due partly to bad weather, but there was also a danger that the Fisheries Directorate might call a halt to fishing after the discovery of considerable amounts of immature capelin in the nets. This capelin is from the 1976 class, which will not start spawning until 1980.

One big outlet for Norwegian winter cod has been Nigeria, which was once the main buyer of dried stockfish. Shipments of 18,000 tons were agreed last year, but actual sales were only 2,700 tons following import cuts by the Nigerian government.

A Norwegian delegation was in Lagos last month to begin negotiations over future supplies. If successful, they may help to reduce a "stockfish mountain" of 21,000 tons. But this year only 3,000 tons of the catch will be dried on the racks.

Brief break during krill study

USHUAIA in Argentina — the most southerly town in the world — had unusual visitors on February 17 when two German stern trawlers called at the end of a 50-day research voyage.

The research ship *Walther Herwig* and the commercial trawler *Julius Fock* are engaged in the 1977/78 West German investigation into Antarctic krill. The expedition is divided into three stages — the first ended on December 20, and the third began on February 23 when the ships left Ushuaia. It will end in Buenos Aires on April 10.

As in the first stage, the ships spent the second stage in the Bellingshausen Sea and the Atlantic sector of the Southern Ocean.

A preliminary report says that krill resources seemed to be sparser than during the 1975/76 expedition but worthwhile results were obtained.

Aboard the *Walther Herwig*, 12 German and foreign scientists studied water temperature, feeding and the extent of the krill in the area.

One highly interesting discovery was of large concentrations of krill eggs in calm water and near the surface. Previously it had been thought that krill spawned around the surface but that the eggs then sank into deeper water.

With nine scientists aboard, the *Julius Fock* concentrated on finding, catching and processing.

It is now possible to detect small swarms of krill and estimate the size of catch while fishing. In this way, the harvest can be adjusted to the processing capacity of the ship.

Ban on meal plant fishing

ALL FISHING for the meal plants was banned in Peru from February 10, after the Marine Institute warned that it was endangering the recovery of anchovy stocks.

The Peruvian canning industry had also complained that industrial catching of table fish such as sardines, mackerel and hake was impeding processing activities.

Despite the already almost complete prohibition on anchovy fishing, some are usually taken with catches of other species.

In an attempt to provide a chance of a living for the small private firms and fishermen who now own the vessels in the Peru purse seiner fleet, the Ministry of Fisheries has allowed other fishing to continue.

The fleet has been going all-out to make up for the anchovy loss and has been catching 12,000 to 15,000 tons of sardines and other fish a day. In addition to the anchovy caught with the sardines, the species was also allowed to be fished off Ilo in the far south from mid-November 1977.

All the fish taken was sold to Pescaperu, the state anchovy company, at set prices for reduction to meal.

DALMOR CATCH

THE 1977 catch of Poland's Dalmor fishing enterprise increased by 13,000 tons to reach a total of nearly 217,000 tons. But it did not quite reach the targets for the year.

For 1978, this high seas enterprise recognises the realities of reduced fishing opportunities. Its target for the year has been set at 210,000 tons.

The limit for sail boats!

● Protection in coastal waters — a small sailboat in Southern India.

INDIA'S small-scale fishermen and their many thousands of primitive sail boats will get special protection in the future if a plan now being prepared is adopted.

In an interim report, a working group appointed by the government suggests that the small boats should be the only ones allowed to fish in the immediate coastal waters five to six kilometres off the shore. Mechanised boats would only be permitted to work outside this limit.

The working group is preparing an integrated plan for the development of India's fish resources out to the 200-mile zone. It is also looking at inland waters.

The plan envisages an investment in fisheries amounting to Rs.10,000 million (about £550 million).

The idea is to incorporate the projects for fisheries in India's six five-year plan (1979-85). If implemented, they would, says the group, double the fish catch (2.4 million tons in 1976) and generate one million new jobs.

By 1985, the working group plans for a fleet of 500 deepsea trawlers, compared with the present 50 or 60. The number of small mechanised boats would rise from 14,000 to 20,000. And another 100,000 sailboats would be commissioned over the five-year plan period.

Among the countries reported to have offered assistance are Britain, Norway, Poland, Sweden, and the United States. Discussions have also been held with representatives of the World Bank.

The overall plan includes development of a coast guard service to protect India's fishing waters from foreign poachers.

MEAL SHIP GETS 200,000 TONS

FOR THE polyglot crews of the most international of fishing operations, 1977 was a productive and very successful year.

The operation is that of the 18,500 gross ton, 205-metre long fish meal factory ship *l'Interpeche*, working under licence agreements off the West Coast of Africa.

Built in 1948 as the Norwegian whale factory ship *Kosmos V*, the Bermudan-registered vessel was converted in 1967. She is fitted out with Atlas Stord meal plant capable of handling up to 2,500 tons of raw material a day.

In over ten years in fish processing, the ship has been steadily busy, spending most of this time off West Africa.

At one time there were four large ships processing fish meal at sea off West Africa. Sardinella and horse mackerel made up the main raw material, and the fish was caught by fleets of purse seiners.

The other ships have gone. One was sold to South Korea and another was sunk after a collision with a cargo ship. The third, the Norwegian *Norglobal*, is now processing capelin in northern waters off Norway and Iceland (see below).

Persevered

But the owners of *l'Interpeche* persevered with the African fishery. As the littoral countries extended their limits, licence arrangements were made.

Fishing is now done by a fleet of ten to 14 purse seiners off Mauretania (which has just extended her fishing limits to 200 miles) and Guinea-Bissau. It goes on for the whole year and in 1977 brought some 200,000 tons to the factory ship.

This yielded about 40,000 tons or more of pelletised meal which is usually transhipped at sea to cargo ships.

The catchers are mainly Norwegian and Dutch vessels, around 35 metres long and of 200 to 300 gross tons.

In all, some 500 people work in the fleet. And they are of 19 different nationalities, including Mauretanians, Cape Verde islanders and other Africans.

The operational and service base of this factory fleet is Santa Cruz de Tenerife in the Canary Islands.

Island limit

NORWAY is considering a 200-mile limit around the Arctic island of Jan Mayen. This may be strongly contested by Iceland on the grounds that the island is uninhabited. But Norway does maintain a radio station there.

The issue will be over whether this qualifies as habitation.

Jute reinforced plastic boats!

INDIA WILL FISHING boat hulls be a new outlet for India's production of jute?

Working with the UN Development Programme, the government Department of Science and Technology is engaged in a project for the manufacture of jute fibre polyester.

Six national research institutes are associated in the project, reports *FNI* correspondent Trevor Drieberg. And fishing boats are among the many possible applications being considered.

Researchers in the project believe that not only jute but other natural fibres plentiful in India could be used for the purpose. Production techniques are said to be simple, requiring only labour.

Jute is used in the form of woven cloth and yarn. When wetted with polyester resin and cured, the resulting material is light, stiff and strong. It is said to be not affected by moisture or heat, and its chemical composition makes it fireproof.

According to the Department, a small boat able to carry a ton of fish could be made of jute reinforced plastic for only Rs.2,000 (about £110) and would last 15 to 20 years.

CHEAPER KRONER AIDS EXPORTS

LAST MONTH'S eight per cent devaluation of the Norwegian kroner has been welcomed by the fishing industry who expect it to make Norwegian fish products more competitive.

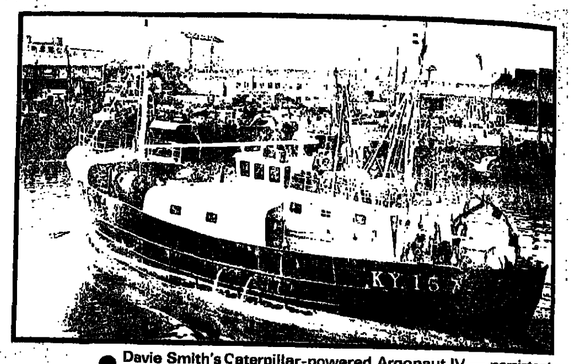
But the fishermen's organisations were quick to urge that any better profits should be used first to raise firsthand sale prices.

Arne Asper, managing director of Frionor, was not sure that the buoyant demand for frozen fish in 1976 and 1977 would continue.

"The international recession has proved longer and harder than expected," he said, "and this hits the more expensive products. Already, a kilo of cod fillet in the United States costs three to four times more than broilers and hamburgers."

Britain's money spinners

Vessel earnings rocket to new record levels



● Davie Smith's Caterpillar-powered Argonaut IV — persistent top earner.

HIGH PRICES on the quayside for cod and several other species in 1977 sent British fishermen's earnings soaring to a new record total of £252 million. The top-earning ship may well have been one of the purse seiners taking mackerel off the south-west of England, but their figures have not been revealed.

Record earner among deepsea trawlers was the 52 metres long Hull-based stern trawler *C. S. Forester* with £740,000. She averaged just under £460 a ton for her 1977 catch of 1,614 tons.

In Grimsby, the side trawler *Vivaria* topped the earners with just under £610,000; in Aberdeen the trawler *Clarkwood* set a record with £521,000.

But some of the most remarkable achievements were by the smaller vessels.

In Scotland, persistent top earner Davie Smith of Anstruther held his place with £434,700. This Caterpillar-powered, steel-hulled boat *Argonaut IV* of 80 ft. (24.4 metres) length was completed in July 1976. Since then she has earned nearly double her cost of building.

Among the other British records, one that stands out is the £690,000 by two Grimsby-based wooden-hull pair trawlers. The *Margrethe Bojen* and *Frances Bojen* last year caught 1,420 tons in 20 trips spread over 231 days.

Iceland's US sales — a huge increase

SINCE 1967, the Icelandic sales organisation in the United States, Coldwater Seafood Corporation, has increased its sales tenfold, from $17.7 to $175 million.

Coldwater recently built a large cold store at Everett near Boston, and a plant for advanced fish processing is being erected there.

Confusion ends in lost order

ON-AGAIN, off-again confusion over a Sri Lankan order for eight trawlers in Norway has ended — in cancellation.

The order, by a previous Sri Lankan government, was placed with two yards for eight vessels 80 ft. (24.4 metres) long.

On January 20, Norway's Foreign Minister told Parliament that the order had been cancelled. But the yards said the Sri Lanka government had asked for the deadline for a final decision to be extended to January 28.

They then learnt that the order, estimated to be worth about 50 million kroner, would be cancelled.

The yards are now asking for a 20 per cent cancellation fee for materials and equipment already bought. The Sri Lankans reject this, and the dispute may go to arbitration in London.

Meanwhile, several yards affiliated to North West Engineering in Aalesund are to build fishing and coastal vessels for Burma to a value of about 300 million kroner (nearly £30 million).

The fishing craft consist of ten prawn trawlers of 20 metres, two 40 m. stern trawlers, and a smaller refrigerated carrier vessel of 250 tons dw. They are all for the People's Fishery Corporation in Rangoon. Delivery is scheduled for 1979.

fishing news international

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It reaches and serves fishermen, fishing companies, processors and distributors in more than 160 countries and territories. It circulates among members of governments and international organisations, and among fishery administration and research workers.

Readers also include designers and builders of fishing craft, makers of fish finding instruments, catching gear and processing machinery, consultants, operators of fishery protection services, and the many other people engaged in an industry that is harvesting and handling 73.5 million tons of aquatic creatures and plants a year.

NO PROMISE OF AN EARLY RETURN

WHEN Mar Elisson, Director of the Icelandic Fisheries Association, was in England last month, he was asked whether there was any prospect at all of a return of British and West German trawlers to waters now inside Iceland's 200-mile limit. His reply was as explicit as we could expect from a high-placed fisheries official in a fish-dominated country, where this is an explosive political issue and the government is a coalition of parties with a small majority.

comment

The urgent, immediate need he said was to restore cod and other stocks depleted by heavy fishing in recent years.

In addition to her fleet of coastal boats, Iceland now has some 70 medium-size deepsea stern trawlers. They must have a share of the catch and at the same time the total needs to be kept within the safe limits estimated by fishery scientists. It appears that this is around 275,000 tons a year for cod, increasing as stocks improve to between 320,000 and 350,000 tons.

But last year (with almost all foreign fishing excluded), the cod haul was some 45,000 tons over the safety line. If the scientists are right, and Mar Elisson thinks they are, then the priority is to cut back in 1978. As in Norway, the argument over who gets what share of the catch and (and whether the allocation was fair) is certain to be bitter and long-lasting.

It does seem therefore that local fishing pressure on the cod and perhaps other stocks will be as heavy and as menacing as anything applied by foreign trawlers. It seems also that Mar Elisson was giving away very little when he implied that the door may not be entirely closed. In the future, he said, as stocks build-up, some fishing by British and West German ships might be allowed on a reciprocal basis.

Exchange

The next question is what could the British, the Germans or any other trawling industry seeking Icelandic cod offer in exchange? Certainly not blue whiting, which does occur inside UK limits and which Icelanders are developing as a new catch. This species is to cod as the sprat is to herrings. It may be years before it is regularly caught and processed for human food.

Icelanders have traditionally fished herrings in the North Sea. But these stocks are so depleted that the EEC has put a total ban on catching them. They are less likely than the Icelandic cod to be offered in a future exchange of fishing rights.

Mar Elisson was therefore perhaps wiser than we all thought at the time to answer as he did. To suggest reciprocal arrangements, even if they may be far away, sounds better than a flat "no hope." But it is obvious from any consideration of the fish that might be exchanged that Britain and EEC countries have very little that is useful to give away in return for the fish some of them still want to take from Icelandic waters.

ICELAND RECORD CATCH...

Norway cod flights still costly

NORWEGIAN fresh fish exporters have decided to start the regular air despatch of cod and haddock to the USA. This follows the success of recent trial shipments.

The first regular despatch was scheduled for February 26 and amounted to ten tons. It was flown to New York.

From there the fish is transported immediately by refrigerated trucks to Baltimore for retail sale at about 30 kroner (5.85 dollars) a kilo.

The Fresh Fish Export Committee is subsidising air freight costs by about three kroner a kilo but hopes eventually to get a freight charge reduction.

At about six kroner a kilo, the freight cost to New York is about 60,000 kroner for a 10-ton load.

PUSHED by a huge haul of capelin, Iceland's fish catch rose to a record 1,365,000 tons in 1977. The capelin share of the total was an enormous 810,000 tons, taken mainly by purse seiners and most of it supplied to the fish meal plants.

About 10,000 tons of the catch (consisting of females in roe) was supplied to the food market in Japan. Iceland, like Norway, has turned to the capelin as a substitute for her lost stocks of Atlanto-Scandian herrings. The catch of this small fish rose to 500,000 tons in 1975 but fell to 458,768 tons in 1976.

When he was in Britain last month to speak to a group of British fishing equipment makers, Mar Elisson, Director of the Icelandic Fisheries Association, said the capelin haul was the result of fishing into very good stocks.

The catch was probably nearing its limit. "We want to keep it below about one million tons," he said, adding that recruitment had been poorer than earlier estimates, which could mean less capelin for a while.

1977 landings top 1.3m. tons

WITHIN the Icelandic 1977 catch of 1,365,000 tons, the haul of cod, saithe, haddock and other bottom fish amounted to 238,000 tons by the deepsea trawler fleet. The fleet of smaller coastal vessels took 233,000 tons.

The capelin catch of 809,000 tons accounted for almost the whole of the rise in Icelandic catch from 986,000 tons in 1976.

Herrings, at 28,000 tons, were slightly down on the 29,000 tons of 1976, prawns were the same at 7,000 tons and lobsters at 2,700 tons.

Catch limits

In Norway, the capelin fishery is this year working to catch limits. Controls in Iceland are different. There are no limits, but nets have a maximum mesh of 19 mm to allow the smallest fish to escape. As in Norway, fishing is restricted to seasons — from the beginning of January to mid-April, and from mid-July to December.

Mar Elisson was speaking as the guest of the Fishing Division of the British Marine Equipment Council at its annual general meeting in Birmingham last month.

The Division is planning to hold a three-day forum in Iceland early in October. Members will present 16 to 20 technical papers. They will also stage a small exhibition in the hotel where the conference takes place.

Welcoming the idea, Mar Elisson said fishing was the most important of Iceland's industrial activities, accounting for 15 per cent of its gross national product. The fishing fleet included 900 decked vessels, 130 of them between 100 and 400 gross tons and 80 larger than 400 tons.

Fleet increase

In recent years there had been a substantial increase in the size of the deepsea trawler fleet. This now totalled some 70 stern trawlers built in Poland, Norway, France, Spain and Japan.

The development of this fleet has begun in the late 1960s. The trawlers were much more efficient than earlier side trawlers which they replaced, and were worked by crews of about 16 instead of the previous 25 to 30.

It was felt that the trawler fleet was now large enough. But boatbuilders were developing other types of vessel. They had built two combination trawler/purse seiners, and had recently launched a combination long liner/trawler designed to tow her trawl while setting her lines.

Mexican purse seiners equipped with WESMAR

THE 108-foot Mexican purse seiner *El Sauzal* recently brought in a 145-ton catch of anchovy that was successfully located and tracked by its WESMAR scanning sonar.

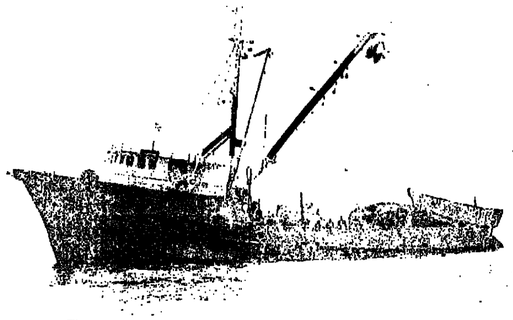
The *El Sauzal* is one of six modern purse seiners purchased last year by the Mexican fishing company Pesquero Zapata. Each of these 300-ton vessels is equipped with a high frequency WESMAR sonar, along with other advanced electronic gear.

Nathan Roundy, WESMAR International Marketing Manager, and Peter Raab, WESMAR Representative for Mexico, were on board the *El Sauzal* for this early season fishing trip. The vessel left Ensenada, Mexico, at twilight and proceeded south along the coast for 40 miles.

At two in the morning, the WESMAR scanning sonar located the large school of anchovy 400 metres from the *El Sauzal*. The captain monitored the school on the sonar as he made his set and hauled in the 145 tons of anchovy. He was very pleased with such a large haul that early in the season.

Ernesto Ruffo, assistant director of the fleet, feels that the WESMAR scanning sonars will add flexibility to Pesquero Zapata's fishing operations. The captains are gaining experience with the sonars and are coming to understand what the sonar will do for them.

Ruffo points to the *El Sauzal* as a perfect example of a fishing vessel getting full benefit from the WESMAR scanning sonar.



The Mexican purse seiner *El Sauzal* was fitted with a WESMAR sonar.

Florida shrimper nets protection

A FLORIDA Gulf Coast shrimper recommends WESMAR scanning sonar for net protection.

"With the WESMAR sonar I am able to pick my way through rock piles without worry of hanging my nets," says William Jeffers, who fishes the tricky waters out of Apalachicola, Florida, in his 65-foot boat *Santa Maria*.

Recently Jeffers and Chris Brannon, another WESMAR user, found themselves dragging the same rocky bottom, neither aware the other had a WESMAR sonar.

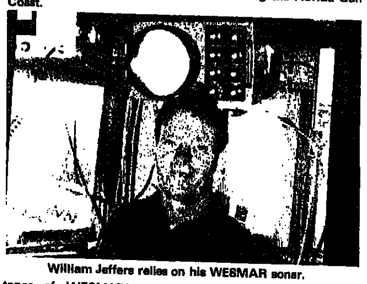
Brannon warned Jeffers over the radio about the numerous rock piles in the area. He said that he was only able to find his way through because of his WESMAR sonar. Jeffers replied that he should then have no trouble since he was also equipped with WESMAR.

Other shrimpers in the area then watched in amazement as the two successfully picked their way through the rocky grounds.

WESMAR scanning sonar is a versatile instrument for the commercial fisherman. Besides shrimping, Jeffers also uses the sonar in his bottom fishing for grouper and red snapper. Fishermen in the Gulf use WESMAR sonar to locate rocks and obstructions where snapper and grouper congregate.

Jeffers once spotted a worthwhile school while shrimping in the Florida Keys. He stopped shrimping and put out his lines. Three days later he had brought in 7,000 lb. of snapper and grouper from this one school.

The *Santa Maria* has met with success along the Florida Gulf Coast.



William Jeffers relies on his WESMAR sonar.

25% larger catch with WESMAR

WESMAR's scanning sonar has become the key to success for Erwin Whitbro's gill netting operation.

"The WESMAR sonar has helped me find fish where I didn't expect to find them," he says.

Whitbro, a commercial fisherman for more than 20 years, fishes Aleska's Cook Inlet for salmon. With the help of the WESMAR sonar aboard his 32-foot *Cathonova*, he brought in 960 salmon the first day of the season.

According to Whitbro, this catch was 25 per cent larger than that brought in by other boats without WESMAR scanning sonar.

"With the sonar I could find the main body of fish rather than guess," Whitbro says.

"Before I had the sonar I just saw jumpers, but the main school might be 300-400 yards away."

Because the WESMAR sonar scans in all directions around the boat, Whitbro is able to locate the salmon without depending on unreliable visual signs.

The sonar speaker is also a valuable tool for Whitbro. After much experience with the sonar, he can tell by the sound when a large school is around for a good set.

From the first year he purchased the WESMAR scanning sonar, he has seen a marked improvement in his fishing success. He feels this improvement will continue thanks to the WESMAR scanning sonar.

New office in Aberdeen

WESMAR announces that its branch office in Aberdeen, Scotland, has been moved and enlarged to further serve the large fishing community in the United Kingdom and Ireland that has adopted WESMAR scanning sonars.'

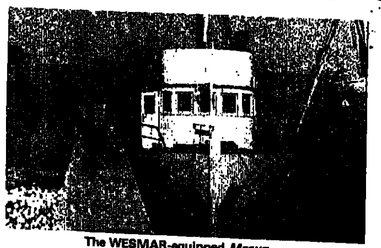
John Lorenz will continue as WESMAR's service representative, a position he has held for the last year. He will be joined by Del Clarke as Sales Representative. Together they will give the commercial fisherman the best possible service.

The new address for WESMAR's Aberdeen office is Bridford, 233 Clifton Road, Aberdeen, Scotland. Phone is 0224-43577.

On a recent visit to the United States, Lorenz was enthusiastic about the acceptance of WESMAR's dual sonar system by such fishermen as David Bevan and the Chambers Brothers. The dual sonar system consists of the SS220 high frequency sonar, the SS230 low frequency sonar, and the R50 chart recorder. With this system, the fisherman has the long range detection of the low frequency unit and the detailed resolution of the high frequency unit.

Top, John Lorenz. Above, WESMAR's SS220 sonar, R50 chart recorder and SS230 sonar.

Yugoslavia goes fishing with WESMAR sonars



The WESMAR-equipped *Masun*.

COMMERCIAL fishermen in Yugoslavia are finding that WESMAR scanning sonar is an effective solution to many of the problems they face.

Perhaps the major problem facing these fishermen is the scattered condition of the fish schools, particularly sardines and anchovy. These fish are so scattered and it is so difficult to locate dense concentrations, that the average catch is only 220 tons per year.

Late last year Nathan Roundy, WESMAR International Marketing Manager, went to Yugoslavia to demonstrate how WESMAR's high frequency scanning sonar could assist in locating fish. The Yugoslavian fishermen were impressed with the demonstration and Arla Fishing Company immediately ordered a sonar for its boat *Masun*.

The high frequency of the WESMAR sonar gives detailed resolution of underwater targets. This makes it possible for the fisherman to determine the densest concentration of fish and make his set accordingly.

Another of the demonstrated advantages of the WESMAR sonar is the tiltable transducer. With this feature, the fisherman can aim his sonar beam to explore all the water around him. When a school is located, he can then track the school.

The excitement generated by the performance of the scanning sonar indicates that WESMAR will have an important place in the future of Yugoslavian commercial fishing.

IN JANUARY, the Council of Europe voted that its 20 member states should observe a ban on sealing for a period of two years. The decision was by a large majority in spite of strenuous opposition from Norwegian and Danish representatives. They took exception to the report which informed members and led to their decision. They pointed out 28 errors in it, and they asked for it to be submitted to experts for further study. Their request was rejected.

When we talk about seals, it is best to make our attitude clear at the start. With most people in the fishing industry world-wide, I oppose indiscriminate slaughter of any marine creature, mammal or fish, or humble mollusc on the seashore. But there must be a balance. When whales were massacred in the Antarctic, this balance was disturbed and pressures were quite rightly applied to curb whaling..

The same applies to seals. In his excellent report to FAO on the resources of the Southern Ocean, Inigo Everson of the British Antarctic Survey tells of the near-extermination of Antarctic fur seals many years ago. Other stocks have been threatened.

There is therefore a case for watching carefully over them, and for maintaining seal colonies where they are in balance with their supply of food. They are attractive creatures with a winsome appeal to all those who have not had to contend with a seal in a fishing net, or compete with them for limited supplies of fish.

But is the danger to their existence so great and so immediate that an organisation as august and, I hope, as busy as the Council of Europe should feel obliged to tell its members to stop killing seals?

The Council is a worthy body concerned largely with the quality of life in Europe, and with the environment. It works to combat pollution, and it urges protection for threatened waters, lands, plants and animals. But only a few of some 20 member countries are involved with seals, other than as censorious observers.

When supranational bodies make decisions remote from the real concerns of most members but of deep interest to a few who stand to lose, they run the risk of being regarded as meddlesome busybodies. Some other decisions by the Council have not unduly troubled its members. This could well be the fate of the proposed ban on seal hunting.

Members who voted for the ban might also have spared a few thoughts for the plight of people who suffer through leaving seals to proliferate. The council was told by Denmark that people in Greenland will be particularly hard hit if they are not allowed to catch seals. About one-fifth of the population there depends on sealing for its income.

Two aspects

There are two aspects of the problems a seal ban, if observed, would cause. The first is the obvious one of depriving seal-hunting communities of a living. But this is the smaller problem, although the livelihoods of many thousands of people will be affected.

In the long-term the real threat is to the delicate balance between fish, seals and fishing communities if seals are to be allowed to increase without control.

To get an idea of what would happen, I asked our Bergen correspondent Nick Wade to call on scientists who have long studied the relationship between seal and fish populations. Their concern, it seems, is not so much over what would happen over the next two or three years.

But over ten years the Barents Sea stocks of seals would probably double. With the harp seal there already estimated to be eating 1.2 million tons of capelin a year, conservation controls which the Norwegians and the Russians are now beginning to apply would be seriously upset. And the fishery could be ruined.

Nick also noted the following from his conversations in Bergen.

"The harp seal stocks in the Barents Sea Newfoundland and East Greenland," he writes, "comprise between two and 2.5 million animals one year and older. They are estimated to eat fish equal to five per cent of their body weight each day, except for a two-month fast during breeding and moulting.

Based on a mean body weight of 80 kilos, that means each seal eats 1.2 tons of fish a year and the whole population consumes 2.5 to 2.8 million tons. That would put the harp seals in about seventh place in the world catch league!

Of these stocks, that of Newfoundland is increasing, that of the Barents Sea is growing rapidly, and the East Greenland stock is recovering from a low and is rising again. Imagine, therefore, what these animals would do to North Atlantic and Arctic fish if the Council has its way!

The view of seal conservationists (and I use the word advisedly) in fishery research organisations is that the growth rate of seal stocks has to be controlled if we are going to continue to rely on the harvest of the sea for part of our food.

Apart from its commercial aspect, hunting has been the most effective way of applying controls. A ban, it is feared, would very soon entail the deterioration if not the end of a long tradition of manipulating seal stocks with skill and care.

Unless those who applied the pressure that got the Council of Europe to propose a ban have come up with some way of seal population control without hunting them then it will inevitably have to be lifted. When it is, large numbers of breeding females plus babies will have to be killed in a mass slaughter of animals that will make present culls look like innocent picnics.

Mass slaughter

As the Norwegian scientists told Nick Wade, managing a seal stock or any stock of wildlife is an undertaking of years of patient work. It can only suffer from haphazard measures.

With them, and with most other people who know the sea and its creatures, I know that a two-year ban will take a living from the sealers and their families and will not in the long run benefit the seal stocks.

Peter Hjul

THE EUROPEAN GREY SEAL — WINSOME APPEAL TO ALL THOSE WHO HAVE NOT HAD TO CONTEND WITH THEM IN A NET.

from the dockside

PANGA POWER!

A northern Chile anchoveta purse seiner, with her panga and net aft.

Anchoveta purse seining from Arica and Iquique in Chile

IN NORWAY they are basdic boats, in South Africa bakkies and in North America dories or skiffs. In Chile they are pangas.

There, the panga or two-boat method of purse seining is carried on by a large fleet fishing for anchoveta out of the northern desert coast ports of Arica and Iquique.

The Chilean panga is a small motorised boat 6.4 metres long and 3.7 metres wide, little more than a wooden shell for an engine.

It is carried out to the fishing grounds, perhaps 100 kilometres out in the Southern Pacific, hoisted up the wide transom stern of its "mother boat" on top of the stowed purse net and floats.

When the anchoveta shoals are spotted and the purse seining operation begins, the panga is dropped astern into the water with the engine already running.

Wide circle

Crewed by one man, the small panga is then driven in a wide circle dragging one end of the net behind. The circle formed is more than 155 metres in diameter, and the net sinks to a depth of 110 metres.

After the panga has completed the circle with the mother boat and the shoal is surrounded, it is moved away to a suitable point on the circumference of the net's circle. There the boat picks up the floating rim and pulls on the net to maintain the tension necessary to keep it in position.

Meanwhile, the mother boat is hauling in the shoal of anchoveta — or sardines or mackerel — and the panga eventually comes alongside.

The purse seiner and her panga may take catches of up to 50 tons at a time. And the anchoveta is supplied to the fish meal plants of the northern ports.

Panga fishing, which was introduced in 1920, is practised further up the coast in southern Peru.

In Norway the basdic boat was an essential aid to two-boat purse seining in the great boom years of the Atlanto-Scandian herring fishery in the 1960s.

But in the big years, the need for basdic boats for the growing fleet of large purse seiners stimulated the growth of GRP boatyards, such as that of the Malo brothers in Kristiansund. And many of these boats were powered by Perkins marine engines.

This mass-produced lightweight engine has also found a ready market in Chile. There are 120 pangas in use with the Arica and Iquique fleets, and 70 of them are powered by Perkins diesels.

Crew of nine

Some boats have the naturally aspirated six-cylinder 6.354 engine rated at 90 hp at 2,000 rpm. The rest use the more powerful turbo-charged version, the T6.354 rated at 110 hp at 2,100 rpm.

In addition to the panga crewman, a mother boat has a crew of nine. She is between 25 and 30 metres long with deckhouse forward.

Drying up the catch. The net has been brought right in with the aid of the suspended power block, and the fish will soon be pumped into the boat.

HOW BABY HELPS MOTHER AT WORK...

Purse seiners busy on the anchoveta shoals in the usually calm sea off Arica and Iquique. One boat (lower left) has surrounded her fish and the panga is tensioning the net. The boat in the centre (with her panga at one end of the net) is halfway round a fish shoal.

Wide support for first Expo Pesca

BETWEEN 80 and 100 exhibitors will be taking part in the first Expo Pesca, the commercial fisheries exposition to be held in Puerto Rico from April 5 to April 8.

Sponsored by the organisers of the highly-successful Boat Expo in the United States, Expo Pesca is being staged in the Roberto Clemente Coliseum in San Juan.

The organisers expect a "truly international atmosphere" at Fish Expo. There will be exhibitors from the United States, Canada, Latin America, the Far East and several European countries.

Special delegations are expected from Mexico, Panama, and Chile along with groups of fishermen from the United States Pacific north-west and Gulf regions. A total of some 30 fishermen will travel over from South America.

Like the Fish Expos, the exhibition will be accompanied by a comprehensive programme of seminars [illegible] Speakers covering [illegible]

CREDIT CURBS THREATEN NORWAY YARDS

NORWAY'S fishing boat building industry is expected to come up against growing problems in 1978.

A survey by the State Fishermen's Bank showed that more than 30 of the 70 yards fear unemployment because of lack of orders.

To maintain jobs at their present level, the yards will need about 40 orders for boats

Financing this would cost between 200 and 300 million kroner.

But the Bank's present credit limits mean that it can give only limited assistance.

Meanwhile, demand for boats is reported to be high. And the Bank says it has applications for twice as many new building projects as the yards need.

Boat prices double

THE PRICE of fishing boats has doubled since 1970, according to figures published by the Central Statistical Office in Oslo.

For vessels over 100 gross tons, the price index in 1976 had reached 192.5, from a 1970 base of 100. There were further increases in 1977. For boats under 100 tons, the index reached 172.7.

200-mile zone in force next month

New Zealand set for growth at sea and ashore

WITH THE 200-mile fishing zone scheduled to come into force on April 1, the New Zealand fishing industry is gearing up to expand the size and range of its fleet and its processing and marketing capacity.

The New Zealand government has given impetus to industry expansion with its scheme whereby new or near-new fishing vessels may be imported duty free until March 31, 1979, and other incentives.

Since the duty-free scheme was introduced, 12 vessels worth $NZ 11 million have been built or bought overseas. Negotiations are under way for more to be imported. No actual size limits have been set but those of 21 metres in length and more appear to be favoured.

While the catching side of the industry has moved to increase the size and range of the fleet, processors are expanding shore based facilities.

Expanding

At Nelson, strategically placed on the north of the South Island, Seaford Products is spending $NZ2.3 million on expanding its processing and cool storage plant, building new wharves and providing modern catch unloading gear such as fish pumps and conveyors.

The company recently took delivery of two new 31-metre steel pair trawlers built in Japan.

Named the *Fifeshire* and *Whitby*, after sailing ships that brought the first English settlers to Nelson in 1840, they are the most modern vessels in the Seaford fleet.

The company processes a range of seafood for New Zealand and the export trade.

Fish processing companies in other ports in the North and South Islands are also expanding.

Government encourages vessel imports

From April 1 foreign fishing vessels will not be allowed to fish inside the 200-mile zone without a licence (see *FNI* January 1978). Since October 1977, they have been excluded from certain grounds off the North Island as a conservation measure but elsewhere foreign trawlers and squid boats from Japan, the Soviet Union, Korea and Taiwan have been operating up to 12 miles from the coast.

The horizon north off the west coast is often ablaze with lights at night from Japanese squid boats.

The Japanese Squid Angling Association's board is reported to be concerned at the possible consequences of Japanese squid boats being shut out of the New Zealand 200-mile zone if Japan and New Zealand cannot conclude a fisheries agreement.

Squid source

New Zealand is now regarded as being Japan's second largest source of squid after the Sea of Japan, where resources are reported to be declining because of the enforcement of a 200-mile zone by the Soviet Union, and the imposition of a "military demarkation zone by North Korea.

Research order

THE Norwegian Fisheries Directorate has ordered a [illegible] medium-sized research trawler from the Bergen yard of A/S Mjellem & Karlsen. She is due for delivery early in 1979. This ship will be the fourth in a series of 499-gross ton research trawlers from the yard.

The first was the *Dr. Fritjof Nansen* which is operated by the development aid organisation NORAD under the Norwegian flag. The second is the *Bien Dong*, ordered by NORAD and subsequently presented to Vietnam. The third ship, for Portugal, is due for delivery in September.

Mjellem & Karlsen specialises in fisheries research ships. Its most famous vessel is the Fisheries Directorate's very successful *G.O. Sars*.

Its yard is presently being modernised, including the construction of an advanced slipway costing almost £600,000.

SWEDISH HERRING BOATS TRY OUT PLASTIC BOXES

The Fiskladan fish box — designed in Sweden for producer and consumer.

SWEDISH Exportfish, a new selling organisation formed by the owners of some 100 herring trawlers on the west coast, is ordering 20,000 plastic containers of 30-kilos capacity instead of the old wooden boxes.

If the container suits the fishermen, reports our correspondent, the order will increase to 300,000.

Several foreign manufacturers have been competing for this business. The container chosen for the 20,000 order was developed by the Swedish company Fiskladan Packing AB of Gothenburg. It was designed in co-operation with the fishermen users to be acceptable to both producer and consumer.

Fiskladan Packing recently obtained an order from the Swedish International Development Authority (SIDA) for Guinea Bissau.

Canada pressing hard for deals

CANADA is working hard to bring the last of the major fishing powers under treaties which recognise the 200-mile zone created last year. Some discussions have been held with Japanese and European Economic Community officials and more talks are expected soon.

The Soviet Union, Norway, Poland and East Germany signed bilateral treaties before the zone was created. Cuba, Rumania and a number of others signed afterwards. The later treaties also acknowledge that Canada has a special interest in the management of fish stocks beyond the 200-mile zone.

This area, the eastern part Grand Banks and Flemish Cap, accounts for 10 per cent of total catch taken off the Atlantic Coast every year. Canadian officials and scientists say that heavy overfishing there would disrupt efforts to rebuild the stocks within the zone.

Canada tried to get the International Commission for the Northwest Atlantic Fisheries dissolved and replaced by the Northwest Atlantic Fisheries Organisation at special meetings in Ottawa.

That initiative stumbled over the beyond 200-mile management demands from the Canadians.

Crab feast for Caspian sturgeon

FISH IN the Caspian Sea are enjoying a doubling of some food sources as the result of a lucky accident, say Soviet fishery scientists.

Dutch crabs were accidentally introduced in the 1930s, when Black Sea mullet were brought in for acclimatisation. They are now providing food for Caspian white sturgeon and other local species.

They have also become the main food of the rare spiny sturgeon.

Although scarcely seen, the crabs have much increased and are found at depths down to 25-metres.

ELECTRICITY GIVE AWAY

FISH MIGHT one day reveal themselves by the electrical field they generate around their bodies.

Scientists in the USSR have found that all fish constantly generate a weak electrical field. When they are attacking or defending, this intensifies.

The total electrical field is of such a strength that it can co-ordinate the movement of individuals, and may thus be a factor determining shoal movements.

Sensitive devices

Highly sensitive devices have been developed in the USSR to record this electricity. Installed in fishing boats, they can alert fishermen to the approach of a shoal.

Initial tests in reservoirs are reported to have produced favourable results. But the equipment's use is confined to small bodies of fresh water because it can detect fish-generated electricity only over a distance of one kilometre.

Sweden's limits will all be median lines

FOR A country such as Sweden with so many neighbours across her fishing sea, proclaiming a new, wider limit creates some complicated problems.

In January, when Sweden joined the 200-mile nations, she had only reached agreement with Finland over fisheries in the Gulf of Bothnia.

Nowhere can she actually have a 200-mile zone. And median lines have to be worked out with six other countries.

In the Baltic south of 59 deg 30 deg. east of Gotland there is a grey zone between Sweden and the USSR. Sweden calculates the limit from her island of Gotland and the USSR from the Swedish coastal line.

The Baltic fishing states have created the Baltic Sea Fishery Commission and this apportions the total allowable catch (TAC). Members of the Commission are Poland, DDR, the USSR, Finland, Sweden, and the EEC (mostly Denmark).

In the area of the Kattegat, Sweden and Denmark have shared the herring quotas. One special agreement bars trawling on Sundays.

There is also an old agreement due to last until the beginning of the year 2000 about mutual fishing up to four miles off the coast by Norway, Denmark and Sweden. They negotiate each year over quotas for herrings, sprat and mackerel.

Swedish fishermen are in a weak position in the North Sea, a traditional area. There, Norway decides what shall be taken.

Negotiations with the EEC have been more difficult. Quotas have been fixed temporarily at three-monthly intervals while the EEC countries themselves try to determine their fishing policy. Sweden has been trying to get them fixed on a yearly basis.

She now has about 5,000 fishermen who take a yearly catch of some 200,000 tons worth £25 million. This is about the same volume as was taken 20 years ago by twice the number of fishermen and boats.

But the industry has suffered through limits extensions. West coast fishermen have been particularly hard hit by restrictions in the North Sea.

BROTHERS LOST IN TRAWLER

UP TO LATE February little trace had been found of the small Swedish stern trawler *Glittsjo* of Vrango, an island near Gothenburg. The boat disappeared with her crew of three brothers while fishing close to the west coast.

A new type of boat, the *Glittsjo* was built in Sweden and delivered in September last year. She was 46 ft. (14 metres) long with a steel hull and was powered by a 350 hp Volvo Penta engine.

In the first 24 hours after she went missing, more than 30 boats searched the area where she had been fishing. Only fish boxes and deck boards were found.

French sea delegate

IN ITS programme for the general elections this month, the French government is promising to meet demands from the fishing industry and create a new post of Delegate for the Sea.

But since the announcement was made, reports *FNI* correspondent Henry Kahn, it seems Monsieur Sea (as he is being called) will not have very wide powers.

He will in fact take over a job already being done by an inter-ministerial group which co-ordinates all action, programmes and projects concerning the sea.

Catch boost

BETWEEN now and 1982, an estimated 16 million colones (about £3.8 m.) is to be invested in El Salvador in projects to boost the fish catch for domestic consumption. The Inter-America Development Bank (IDB) is to assist these projects with a loan of 1[illegible] m. colones.

On top of a salmon haul on the UK east coast. Will commercial fishing wipe out this species?

UK Minister urged to save salmon

IS THE Atlantic salmon in danger of extinction? One man who fears this is British MP Jasper Moore.

In the House of Commons last month, he urged Minister of Agriculture and Fisheries, John Silkin, to get together with Ireland's Minister of Fisheries to work out a scheme to protect stocks from the rivers of the British Isles.

What he and many others want stopped is "the terrible drift netting on our shores, estuaries, seas and oceans." This, he said, is doing dreadful damage to the salmon.

As Scottish fish farmers have been learning recently with the commercial fishermen, the Atlantic salmon is a deep-felt emotion as well as an animal.

Nature lovers, usually prosperous ones with salmon streams to preserve, would like this splendid creature kept from all but the people who can afford to pay to play with it.

Fishermen, on the other hand, while recognising that the salmon should be treated with care and not fished indiscriminately, see it as a species important to many small operators.

Minor contributor

Surprisingly for all the publicity it gets, the Atlantic salmon is a very minor contributor to the food fish supply.

According to figures in the FAO *Yearbook*, in 1968, the reported catch was 3,100 tons in the north-west Atlantic region and 9,600 tons in the north-east. It rose to about 15,000 for the two regions in 1973 and fell to 11,000 tons in 1976.

The United Kingdom share was down from 2,400 tons in 1973 to 1,350 tons in 1976, but it was only around 1,680 tons in 1968. The Irish catch (1,400 tons in 1968) fell from 1,900 to 1,500 tons.

Small though they are, these catches are very important to a number of fishing communities, who would suffer far more than the ardent salmon protectionists from any demise of the species.

Another aspect worth thinking about is that the whole North Atlantic Ocean supports a recorded commercial catch of only 11,000 to 15,000 tons of salmon a year.

The North Pacific in 1976 yielded up a harvest of 400,000 tons. And protagonists of stock enhancement believe this is far below the harvest that could be developed and sustained by adding ranching to natural production.

FAR SOUTH IN KRILL PROJECTS

THE NEW Polish research ship *Profesor Bogucki* built in Gdynia Shipyard on a B-417 class trawler hull (See *FNI*, February 1978) is now working on a krill investigation project in the Southern Ocean.

She is operating with the Dalmor enterprise factory trawler *Sagitta*. To begin the first part of their expedition, the ships travelled across the Atlantic via the Drake Strait and then rounded Cape Horn. They later continued across the eastern coast of the Antarctic continent to work in the southern Indian Ocean. Their expedition ends in Cape Town.

Kerguelen Islands

When she returns to Poland in May, the *Profesor Bogucki* will have covered about 40,000 miles.

In another part of the Polish krill survey, two ships chartered by the Sea Fisheries Institute — the *Manta* from Odra and the *Rekin* from Gryf — have been working in the area around the Kerguelen Islands.

Poland is today one of the leading catchers and developers of Antarctic krill. Her haul in the test voyages in 1976/77 was around 30,000 tons. It will probably be exceeded by the 1977/78 voyages.

Spanish yards fulfil 21-ship contract

WITH THE delivery of the 3,888 gross ton supertrawler *Rio Zaza*, the huge contract placed by the Cuban government with two shipyards in Vigo, Spain, has been completed. The contract was the largest for fishing ships ever placed in Spain. It was for 21 TACSA-95TF factory stern trawlers at a cost estimated to be equal to about US$145 million.

The order was placed initially in June 1973 with the yard Astilleros Construcciones S.A. It was then for ten ships. Another 11 were added later in the year. In September 1973, a Cuban delegation visited the Spanish firm's Meira yard on Vigo Bay for the keel laying ceremony.

Standards

Sixteen of the ships were built by Astilleros Construcciones and five by another Vigo yard, Hijos de J. Berreras S.A.

Designed by Tecnaco S.A. of Vigo, they have been built to the standards required by Lloyd's Register classification + 100A1 Stern Trawler Ice Class 3, "LMC + RMC.

With a length overall of 106.86 metres, the ships have a breadth of 14.53 m., and a draught of 5.5 m. Deadweight capacity is 3,206 tons.

After rivers

All ships in the series are for Cuba's high seas fleet, which operates mainly in the hake waters of the south-east Atlantic.

Each is named after a river in Cuba. The first, the *Rio Damuji*, was completed in April 1975.

The Deutz 12-cylinder main engines develop 4,000 bhp at 430 rpm (bore 400 mm and 500 mm stroke). They were built, tested and installed under Lloyd's Register special survey by Hijos de J. Barreras S.A. under licence from Deutz.

In each ship four auxiliary Barreras Deutz engines drive four 400 kW generators (380 volts, 50 Hz AC). All the ships are fitted with controllable pitch propellers and Kort nozzles. They have a speed of 14 knots.

Refrigeration machinery had to be able to maintain a temperature of minus 25 deg. C with the ambient sea temperature a maximum of 35 deg. C. A total power supply of 1080 bhp is supplied to three Howden-Godfrey screw-type refrigerating compressors.

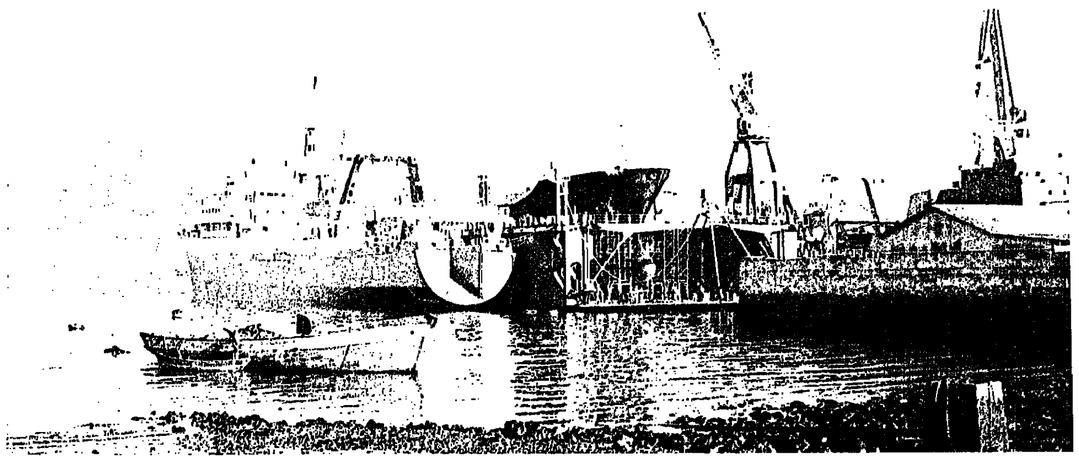
Freezers

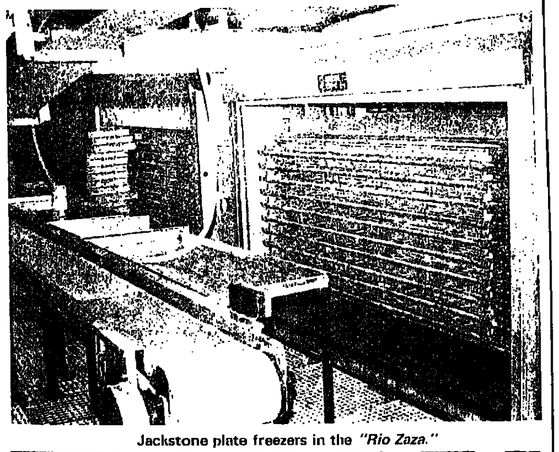
Refrigerant R22 is used in three shell and tube compressors and two shell and tube evaporators to cool the circulating brine. Contact plate and tunnel blast freezers have a capacity for 50 tons of headed and gutted white fish and 20 tons of fillets.

Three refrigerated chambers with a total capacity of 3085 cu. m. are insulated with polyurethane coated with plywood and glass fibre polyester, and are cooled by brine circulating in grid-type coils.

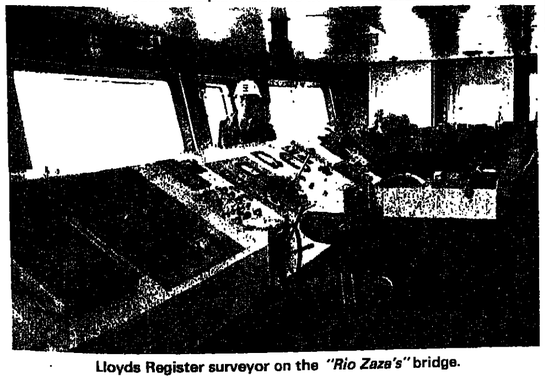
Machinery on the factory deck includes German Baader fillet lines. Waste fish and offal is reduced to meal in Schlotterhose plants.

The main winches are Belgian Brusselle electrically-powered machines built in Spain under licence by Barreras.





Jackstone plate freezers in the *"Rio Zaza."*



Lloyds Register surveyor on the *"Rio Zaza's"* bridge.

London-based FDL believes in follow-through and integrated service

FDL's Ian Richardson — an ambition achieved

HOW TO SUCCEED AS A FISHERY CONSULTANT

by Peter Hjul

IN LESS than five years since it was started, the London-based consultancy firm Fisheries Development Ltd., has worked on more than 60 projects in 30 countries and territories.

From the original three specialists who left secure executive jobs in the British White Fish Authority to move out on their own, it has expanded to 16 specialists, plus a small administrative staff and more than 100 people available for part-time contract work.

By any standards, FDL can be said to have accomplished all that was hoped for it when managing director Ian Richardson teamed up with London merchant bank Arbuthnot Latham & Co., to fulfil a long-felt ambition.

As research secretary in the WFA, Richardson had been involved in most of its development projects. A particular interest was the development of fin fish sea farming. With Torry Research Station, he was also involved in the efforts to try and persuade British trawler owners to venture into the south-east Atlantic for hake.

From what he learnt, he began to work out ideas of how people experienced in fisheries might best use this for the benefit of others.

The consultant has long been a familiar figure in the fishing industry. Consultancy firms have come and gone — some exhausted by high-minded excess of zeal but most because they did only half a job, failed in follow-through and backed people with expertise appropriate to the job in hand.

From the beginning in 1973, the bank was no silent partner. Its interest was close and active. It gave FDL the backing and the financial acumen that balanced the urge to get business. Jobs were carefully assessed. Richardson and two former WFA colleagues — David Insull and Jim Soulsby — who joined him as co-founders soon showed that FDL was a consultancy that gave an honest opinion, even if it meant loss of a project.

Will be blamed

"Many small projects do not really develop," Ian Richardson told *FNI*. "If you go ahead on a poor project, you will be blamed and the reputation of your company will suffer. We have always to be careful. But it can be difficult when a client insists on going ahead despite advice not to.

"We get this fairly often in fish farming. It is astonishing that someone with no experience of fish confidently expects to be able to work closely with them, breed them, nurse them, and feed and accommodate them. Would he consider trying this in agriculture or stock farming?"

In the same way, he added, "just because a government sets up a big fishing corporation, it cannot be assumed that it has some instant capacity for fish company management."

It is here that Richardson gets on to his favourite theme, and perhaps the secret of his company's success. The good fisheries consultant, he believes, has to be much more than a mere in-out paid spectator dispensing advice.

At FDL the emphasis is on wide involvement and on follow-through — an integrated service for integrated fishery development.

There are, of course a number of jobs (perhaps most of them) where the requirement is specific and limited. FDL has recruited fleet managers, designed an oyster hatchery, studied and reported on trout markets, and advised on the purchase of an oyster farm.

But it has also taken on the formulation of development programmes and studies expected to lead to the setting up of a fishing industry. Examples are its work on St. Helena for the Ministry of Overseas Development, and its project in the Seychelles.

Asked to explain what he meant by integrated service, Richardson described a developing country with a fairly good, long-established small-scale fishery. The small boats had little reason to venture far from the shore. Most were canoes landing on beaches. A short distribution in the areas. There was no real supply network from the coast inland.

Industries

At one or two main ports and cities expatriate companies had set up industrial operations based almost entirely on high-priced species — such as shrimp or tuna — for export. Not much of the money earned would come back into the country.

Then the limits are extended out to 200 miles. The government becomes aware of the potential value of the resource. It calls for surveys of stocks and perhaps of markets. These are done and the attract funds — multilateral through say the UNDP, bilateral from bodies such as CIDA, NORAD and US AID, or from private investors.

"The basic question then," said Richardson," is what should be done next? Money can be poured into vessels, processing plants, ice plants, jetties and training schools. But acquiring boats, or factories, does not automatically make a fishery work."

He mentioned two basic possible complications. One, the whole programme might be out of balance. Two, the country's traditional experience has been in small-scale fishing and it is now looking for a whole range of expertise. It needs to consider stock management, fleet organisation and maintenance, handling, processing and wide distribution locally and for export.

The question is how do you obtain these expert services and how do you get the balance?

Training

It may be possible to arrange for training of crews and factory workers. But management aptitudes have mainly to evolve through experience on the job. Can this be accomplished within a time scale compatible with the aspirations of the country?

One way could be through joint ventures that quickly involved local staff and fishermen. Another is through a management arrangement in which the government or development body says, "This is what we want done, get on with it."

If the people brought in also took part in earlier preparatory stages, they would be following the development through. This, as FDL sees it, is an integrated service.

Understanding

To provide this, a consultant needs to develop a clear understanding of what really needs to be done in a fishery in order to make the most effective use both of resource and of outlets for it.

A government or a big organisation might see "the get on with it" as the technical knowledge needed to build a harbour or design a boat or a factory. But the physical structures or vessels built at considerable cost may be only partly used.

The applied fishery expertise of the consultant has to be much more than theory or estimates, or even the facts of what can be caught. In many cases, it needs to go beyond feasibility studies and to precede the boat, the harbour and the factory.

"Our job is only really done," says Ian Richardson, "when the project is working."

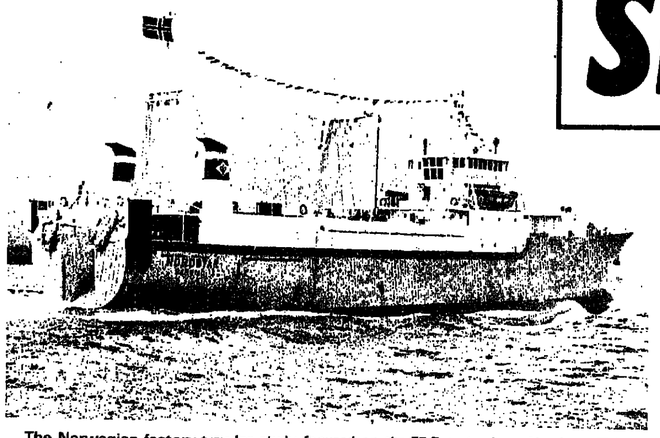
At its simplest level, fish distribution may be the boy and his donkey, as can be seen above in this picture of a village in Baluchistan.

When limits go out and new ventures are planned, how do small fishing communities like this one in Ghana fit in? PICTURE:FAO

Governments do not have an instant capacity for running a fishery industry. This is evident in Dakar, where these tuna purse seiners lie rusting alongside the silent factory of the failed State tuna company.

Several stages further from the donkey boy, a planned fishery development project gets iced fish moving out in plastic containers by truck to the interior of Peru.

SHIPS TAT ATTRACT THE YOUNG MEN...



The Norwegian factory trawler study focused on the 75.5 metre long *Nordstar*. This 1,600-ton ship was built by the Aukra Bruk yard in 1969.

IN A COUNTRY whose fishing industry is dominated by small, short-range boats and by small-boat thinking, the factory trawler owner has had a difficult time. This is despite the fact that Norway was one of the early users of stern trawlers, and helped to pioneer the processing of fish at sea.

The factory trawler fleet of about a dozen ships is subjected to strict (some would say draconian) controls and fishing industry investment regulations have kept down its growth.

Yet the fleet and its operations are interesting in Norway and outside. The ships are well-designed and run, and they have attracted some of the best of Norway's young fishermen.

The factory trawler in Norway's fishing fleet

The factory fleet might also be regarded as a case study of how to survive under the most adverse circumstances — natural through the decline of stocks, and government and industry induced because of the restrictions.

Such a study has now been made by an economist working for the Norwegian School of Economics and Business Administration under the auspices of the Norwegian University of Fisheries.

Uncertainty

Odd-Helge Skog had to work during a period of uncertainty and considerable change in Norwegian fisheries but he completed his study last autumn. It has been published by the Norwegian Institute of Fishery Economics, whose editor is Gerhard Meidell Gierhardsen.

"Our factory trawler fleet has been developed by some of our ablest men in the fisheries, and it is the industry's legitimate child," writes Professor Gierhardson in a foreward. "It is so valuable that it ought to be made available to a wider readership than usually is the case with seminar works."

The study is in Norwegian, but has a summary in English. It concentrates initially on one trawler — the 1,584-ton *Nordstar* — whose owners and crew co-operated fully with Mr. Skog. From this minutely-studied example, he goes on to describe and discuss the technical and business management problems of the whole fleet.

Developed in the 1960s and 1970s, the fleet in 1977 totalled 13 ships taking about 11 per cent. of the Norwegian quota of Arctic cod. In the past few years most of their fishing has been off the coast of Finnmark and in the Barents Sea.

Each ship has a crew of 31 to 40, and makes an average of three trips a year. The ships concentrate on fillet production and cod makes up 80 to 90 per cent. of their raw material. Fillet capacity is about 500 tons a trip. Almost all the fish landed by the trawlers is in the United Kingdom "which is and has always been the dominant market."

Costs soared

Skog found that operating costs soared over the period 1972 to 1975. The increase was 39 per cent. from 1972 to 1973, 40 per cent. from 1973 to 1974 and 14 per cent. from 1974 to 1975. Income rose 56 per cent. from 1972 to 1973 and 61 per cent. from 1973 to 1974. But operating incomes fell by 2.5 per cent. from 1974 to 1975 and 5 per cent. from 1975 to 1976.

However, the firm operating the *Nordstar* had its best result in the above period in 1976 with 2,351,688 kroner (about £250,000) and its worst in 1972 with a deficit of 323,076 kroner.

One of the many operating and supply factors which the Norwegian trawler owner has to consider is whether to deliver direct to the market or whether to have this done by a cargo ship.

Factors to watch include loss of fishing time, port conditions, more handling, and less security. The most important factor is the size of catch lost. With trawlers now under strict quotas, the odds are probably in favour of direct delivery.

Profitability

In Norway a government Fisheries "Budget Committee" each year works out, on a sample basis, the profitability of all vessels larger than 40 ft. which fish full-time. Between the period 1968 to 1974, there was a drop in average profitability per vessel from 2,782,000 to 884,000 kroner. But earnings per crew member rose from 46,000 (about £4,600) to 73,000 kroner (£7,300).

When vessel groups are compared, the ring net vessels (purse seiners) were the most profitable and their crews the highest earners. Skog calculates that the factory trawlers did not do so well. Their profitability fell from 31 to only three per cent., despite the fact that the largest ships gave the largest share per man in 1974.

The most common argument against factory trawlers in Norway is that they do not help to maintain population in coastal areas, where young men are leaving for the cities and other work. In the *Nordstar*, the average of the crew between 1968 and 1974 was 28 to 30; in the 1975 census the average age of all Norwegian fishermen was 44.

Fishermen have been moving out of the industry. If the number is to be stabilised at, say, 15,000 and also increase output, something has to be done to attract people into fishing. The yield per fisherman must be higher.

Skog says the trawlers are important in recruiting labour. The *Nordstar* averages more than four trainees a trip.

This labour is also more productive than in most other fisheries. A factory trawler catches about 4,000 tons of round fish a year, or about 100 tons per man.

He also finds that the ships employ people from the small municipalities and "there is no reason to claim that employment leads to migration to larger communities."

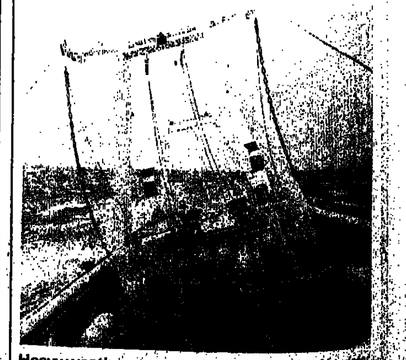
Exports

In recent years, these trawlers have provided more than half the Norwegian fish fillet export to the UK. Prices obtained have been above average with a total value in 1975 of 120 million kroner. This was 18 per cent. of the total value of all Norwegian fillet exports.

But, despite their contribution, these ships had their share of the cod quota for all Norwegian trawlers cut from 22.6 per cent. in 1976 to 20 per cent. last year. And in the long-term plan put forward for Norway's fisheries, factory trawlers are included among the vessels whose numbers should be allowed to reduce by natural wastage.

From his study, however, Skog appears to come out on the side of the trawlers. His main conclusion is that, despite expected great changes in the Norwegian fishing fleet, "there might be the possibility for some factory trawlers to continue in operation."

Not all trawlers have been able to stay in fishing under the constraints imposed on them. Built in 1970, the 1,600-ton *Gadus II* was later sold for conversion to oil rig work.



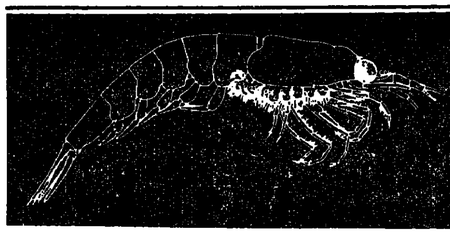
Heavy weather at sea, and ashore, for the *Nordstar*. But her young crew earn well and they stay in the fishing industry.

Another into oil surveys

YET ANOTHER Norwegian factory trawler is being taken out of fishing and converted for oil survey work. She has been acquired by the Geo-physical Company of Norway.

The ship is the 63-metre long *Malene Østervold*, which was built for British owners in 1965 as the *Cape Kennedy*. She later became the *Ross Kennedy* and then the *Ross Intrepid* before being sold to a Norwegian owner.

She is being converted for her new work by the yards Fritjar Mek. Verksted and Mjellem & Karlsen.



KRILL HUNT!

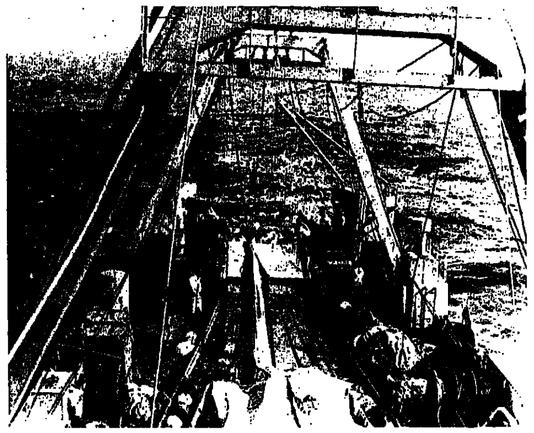
PART TWO

● Before the end of this century, the major marine fishery could be in the waters around the Antarctic Continent for millions of tons of tiny crustacea only 40 to 60 mm long. The nature of the Antarctic krill resource, how it might be harvested and its uses are discussed in three special reports to the UNDP/FAO Southern Ocean Fisheries Survey Programme. Last month Peter Hjul drew on the report — The Harvesting of Krill by G. C. Eddie — to outline how this creature is being found and caught. He continues with a brief review of Eddie's indications how the fishery might develop

IN THE present phase of development, the commercial fishing vessels working on krill in the Southern Ocean have been orthodox large distant water stern trawlers. They are equipped to process their catches aboard. Apart from the trawler-type research vessels, they are ships displaced from other more conventional areas and stocks.

The methods of catching they use are described by Gordon Eddie in his FAO report The Harvesting of Krill (see February *FNI*) Full-scale fisheries on the Antarctic krill will, he says, be developed initially with the aimed single-boat mid-water and surface trawl. But this may not be the only or the final method adopted.

GORDON EDDIE: Pelagic trawl may not be the only method .



The mid-water trawl fishing for Antarctic krill is being done from trawl decks such as this, but in much worse conditions.

One of the objections to such mid-water trawls (and to purse seines and ring nets, which have also been tried) is that they deliver their catches onto the vessel intermittently in fairly large batches. This gives problems in handling and storage.

The food technologist and processing plant engineer would much prefer a steady and continuous flow of raw material. Also, by the time a large catch is spilled out of the cod-end of a trawl, many individual animals may be dead or dying, or have suffered damage which leads to accelerated spoilage.

With krill this may be a particular problem. In his FAO report, G. J. Grantham says that the inherent instability of krill after catching has profound implications for processing and pre-processing, on product type and quality, storage regimes and even vessel type and fleet structure.

Once they are landed, krill spoil rapidly because their organs — particularly the liver and stomach — contain highly active enzymes which cause the rapid development of autolysis. They can be held at ambient temperatures for only a very limited period before being preserved. It is also not practicable to transfer the catch under these conditions from one ship to another.

Grantham notes that the Russian consensus is that krill should not be held for more than one hour at 10 deg. C before processing, or for three to four hours at 0-7 deg. C. This has been confirmed by the Polish and West German expeditions.

Two-boat trawling may, says Eddie, have some advantage over single-boat methods, including a greater facility for fishing the surface layers. The equipment is simpler but the skills required are equally high.

The most obvious possible applications would be if it were found practicable to fish the krill off South Georgia and from Tierra del Fuego using 30 to 50 metre long vessel from shore bases, or as catchers feeding a mother ship.

Three ships

Eddie also mentions proposals for a three-ship system. In this, two ships would tow a trawl whose cod-end would be connected to a third ship.

Such systems, however, need sophisticated technology and are not for the immediate future. Indeed, innovations may be slower than in more conventional fisheries.

In the Antarctic, the risk, the complexity and variety of possible fishing systems and the required scale of investment are all very much greater. Presently, only a few large companies, state fishing corporations and governments are able to afford the probes in the area.

High cost

Even exploratory fishing is a complex and costly undertaking. In his report, Eddie goes into some detail discussing technical and economic factors that will govern choice of vessel, method of processing and system of operation.

One factor, which we have noted before in *FNI*, is that in the present development projects a number of the participating countries are working trawlers displaced from other grounds.

"These operators," comments Eddie, "may have the option of redeploying their surplus vessels in the Southern Ocean."

The costs in this case may be regarded as the difference between the costs of re-equipping the ships and operating them and those of keeping the ships laid-up or sending them prematurely for scrap.

Eventually krill fishing will need to be costed on the basis of new ships specially designed and it is on this that Eddie concentrates in his report.

If new ships are required, the designer will have to consider size, hold capacity, endurance and in particular how they will keep and process their catches. If the chosen system uses autonomous trawlers, "these are likely to be of unprecedented size."

Novel types

Whatever the ship, the factory will probably contain plant more complicated and with larger throughput than any now installed in freezer and factory trawlers. Some of it will be of novel types.

Trawlers of more than 100 metres long overall are in service. Ships of 115 metres are under construction and they have cargo hold capacities of 4,500 cu. m.

Assuming an average catch rate of 150 tons a day over a season of 150 days and a practical rate of stowage of 1.5 cu.m./ton, a trawler producing 4,500 tons of product (an average yield of 20 per cent) would fill 6,750 cu.m. a season. Such space might well be available in a trawler of 125 to 130 m. long if the additional length of hull was devoted mainly to hold.

No problems

One question would be whether such a trawler would be operationally practicable. In the opinion of one fishing technologist, expert in working mid-water trawls from large stern trawlers, ships of 150 m. would present no problems.

No problems to the designer, perhaps. But the cost could be daunting. Eddie recognises this when he says that, in the early years, large scale fishing of Antarctic krill may not be "economic." This may well be so even if processes and products are fully developed and refined and vessels and equipment brought to a high degree of reliability.

There are two reasons. One is that if existing vessel types are used initially, they may not be able to attain, or take advantage of, the highest possible rates of catch. The second is that even if new vessels are introduced, there will not be enough information and experience to allow near-optimum designs in the first two or three years.

An example

Giving the North Atlantic as an example from his own experience, he points out that some of the early freezer and factory trawlers built for the fisheries there "were unimpressive in commercial terms." Yet comprehensive information on catch rates was available and there was long experience of the fishery.

In the krill fishery, one very large area of uncertainty is that of catch rates and their fluctuations. More information based on practical experience is urgently required. And this should be of a kind that can be used by vessels designers and process engineers.

During further probes with commercial ships, he suggests that full-scale fishing should be simulated over several days, in various areas and at various times during the season of about five months from early December through April.

Another area of uncertainty is in the types of products, their yields and values. This indicates further practical development work and market trials, including work related to the needs of developing countries.

One priority problem is that of determining just how long krill can be held in buffer storage and still remain fit for processing. Eddie suggests that elucidation should be sought through practical experiments on a quasi-full-scale.

The effects of the following variables should be studied: size of krill, physiological state, condition when spilled out of the trawl, temperature during buffer storage and pressure to which it is subjected, type of buffer storage, type of product, and quality standards applied to product.

Done at sea

In particular, the effects of immediate immersion in agitated chilled seawater should be examined. The effects of degutting before buffer storage should be studied and so should the effects of emptying the trawl by pumping.

Much of the product and process development may have to be done at sea. But further experiments are "very desirable" into the effects on quality of raw frozen krill of the following factors: condition of the krill when brought aboard, pre-freezing treatment, speed and type of freezing, storage temperature, speed and conditions of thawing.

The apparently minor difficulties in krill meal manufacture will probably be resolved fairly quickly. Eddie mentions three possibilities that "may require deliberate action by way of technical development." One is a process that removes or recovers a worthwhile proportion of the oil. The second is an investigation of low-temperature processes, for example, vacuum drying. And the third involves novel high-performance plant and processes.

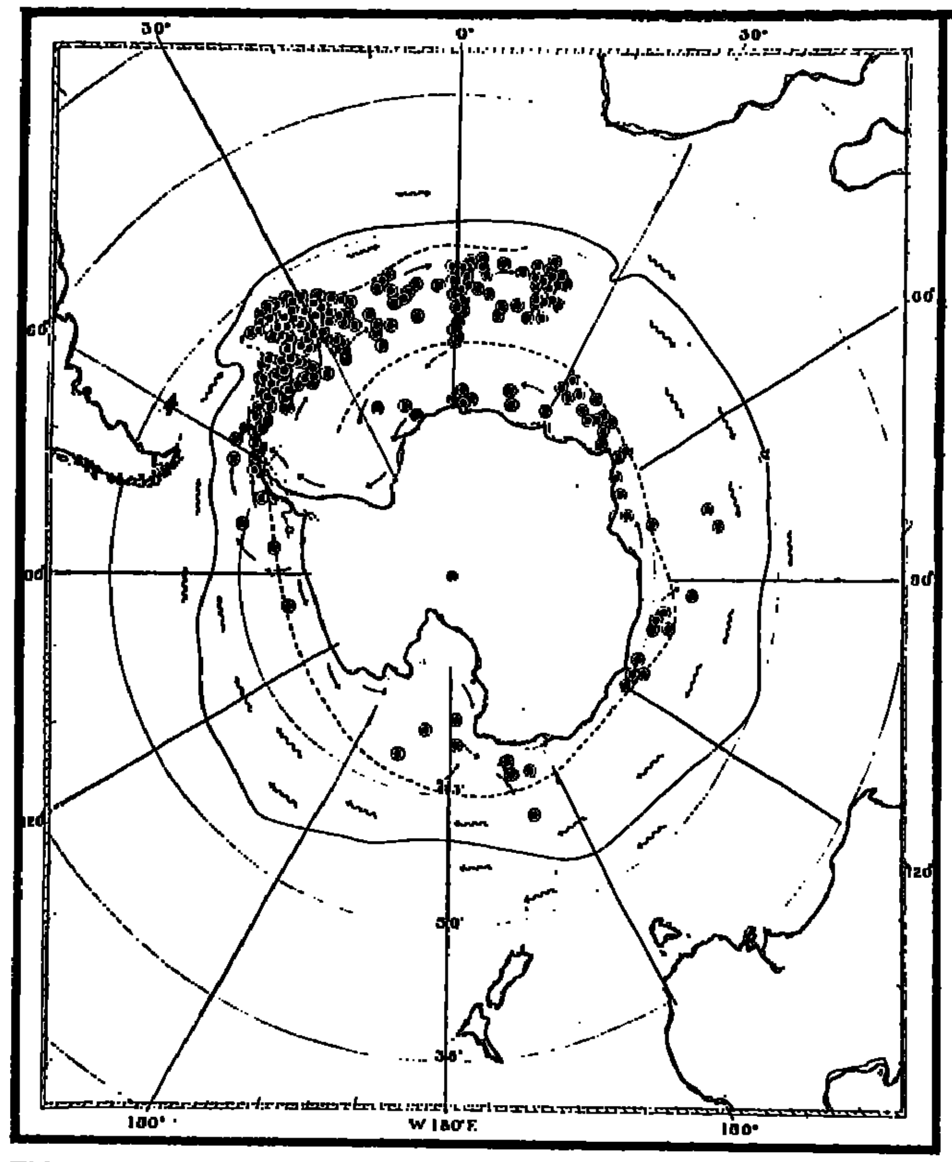
Knowledge and experience of the Antarctic krill fishing are accumulating rapidly, says Eddie, "and this report will soon be out of date." Investigation programmes by future krill expeditions to the Southern Ocean should be prepared with some appreciation of what the engineering designer and the investment analyst require to know.

He also mentions another need which may arise because of the Southern Ocean's peculiar remoteness, harsh environment and lack of settled human population. This is a comprehensive network of navigational aids, communications and emergency services in the area, "adequate to serve what may become one of the biggest fisheries in the world."

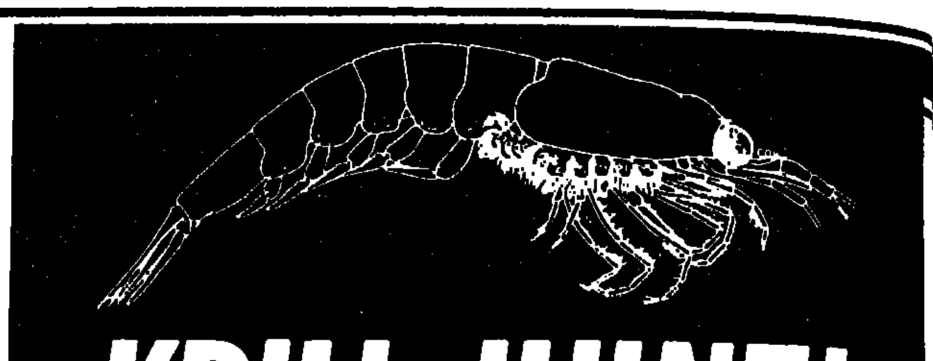
The West Germany stern trawler Weser is one of the commercial ships to have fished successfully for Antarctic krill .

See over

CONSERVING AND USING A KEY RESOURCE



This map of the Southern Ocean region shows how krill swarms are concentrated south of the Antarctic Convergence.



KRILL HUNT!

LESSONS FROM THE SEALS AND WHALES

While the actual fishing operation for krill may be of the most immediate interest to the industry, it is equally important in the long run to know what the krill is, how it breeds and grows, where and how it moves and how it can be processed and marketed. This points to a need to consider management of the stocks, research into them, and also research into processes and products. In their reports to FAO, Inigo Everson and G. J. Grantham review these aspects of the krill fishery.

AS FISHING nations have had their distant water options reduced by depletion of stocks and by extensions of coastal limits, some have looked to the remote and forbidding waters around Antarctica.

There are certainly large living resources in the Southern Ocean.

First, the Antarctic fur seal was hunted and cut down. Then whale stocks were all but wiped out. Now, the hunt is on — for the apparently hugely abundant krill, and perhaps also for squid and other cephalopods, for the poutassou and the Patagonian hake that migrate south, and for other species being identified and test-fished.

This time, however, there is the hope that exploitation may go ahead much more carefully than it has in the past. This hope would be strengthened if the nations probing krill and other Southern Ocean stocks could combine for the safe development of the resource.

Krill is at the centre of the Antarctic food web, says Inigo Everson in his report to FAO. Therefore it is clearly the key resource in the ecosystem, and its conservation is necessary, both for resource utilisation and environment.

Serious gaps

But Everson, like many others, is worried that expansion of Southern Ocean fisheries in the past 15 years has exposed some serious gaps in the resource management presently being applied there.

When we talk about krill and its areas, we are referring to a euphausiid crustacean which occurs almost entirely within the Antarctic Convergence.

Explaining the term, Everson says that the Antarctic surface water, which originates near to the continent, has a slight northerly component. This takes it over several degrees of latitude until at around 55-60 deg. S it sinks beneath the sub-Antarctic surface water. The zone where this happens is known as the Polar Front, or the Antarctic Convergence.

It is an area of great importance ecologically since it coincides with the limit of distribution of many marine species. We shall be hearing more and more about it, just as we are certain to be hearing more about one of its most important creatures.

Of six euphausiids commonly occurring in the Southern Ocean, the largest and most abundant is *Euphausia superba* which is the species generally considered as being synonymous with the term "Antarctic krill."

Management

It is *E.superba* and its habitat south of the Convergence that we must keep in mind when we consider Everson's suggestions for future management of stocks and for the rate of exploitation.

He notes that there are enormous areas south of the Convergence which are not covered by any management procedures applicable to all the resources. In view of the speed at which a fishery can expand once a market has been identified for a particular resource, he feels this lack must be of some concern. And he outlines the two main objectives of a management plan.

The first is to obtain information on the resources and, on the basis of scientific analysis, to make predictions of the effects of different patterns of exploitation on each resource (including the effects on others).

The second, would be to bring together all parties likely to have an interest in the resources and obtain agreement in utilising them within the limits specified by the scientific advisers.

Everson outlines how data collection might be organised and categorised. He then looks at the state of the stocks.

In his report, he describes and maps what is known about many of the identified fish species. These have, he says, been heavily exploited in certain localised areas. On the basis of information available relating to the South Georgia area, it is probable that in the shelf areas a fishery taking about 1.5 tons per sq. km. a year could be sustained. On such a yield, the Southern Ocean could support a sizeable fishing industry. But Everson stresses that this is a very tentative conclusion based on limited information.

Krill catch

The present best estimates of total krill production based on consumption by predators, is over 200 million tons. The present Antarctic fishery may be around 20,000 tons a year. This is minute in comparison to krill production. But, since the fishery is likely to expand and since krill is an important food organism for other resources, it is important that any expansion should be monitored and its impact on other resources carefully assessed.

Several of the nations now engaged in krill fishing could rapidly expand their effort to the point "where a total catch of several million tons is a distinct possibility." Although on present estimates a fishery of this size might have a negligible effect on the stocks, the fact must be faced that the effect might be of major consequence to the resource and to the ecosystem

Encouragement

On the other hand, any total limit of catch should be set so as to give reasonable encouragement to capital investment.

To meet these opposite needs, a management plan should allow controlled expansion of the fishery while giving some idea of long and short term potential for overall expansion.

Everson then suggests that a possible solution to this problem would be to allow each nation to expand its fishery as fast as it wants to a certain level. During the build-up, the stocks of krill and its consumers (where possible) would be monitored to allow a review of the safe limit as it is approached.

His "possible formula" for this expansion is first to permit each nation to expand its fishery at an unlimited rate up to a maximum of say 50,000 tons.

Beyond this level, expansion might be limited to increased catch of say 20 per cent up on the previous largest year's catch.

The initial "safe" limit for the total catch of all fishing nations might be fixed around five million tons a year.

It will, however, be a long time before commercial fishing takes the krill harvest up to this total. For, as G. J. Grantham observes in his report on The Utilisation of Krill, successful exploitation now depends on the development of suitable process and product technology; and on the adoption of appropriate marketing and disposal strategies

Well balanced

The biochemical composition of the animal has been sufficiently studied to show that this is similar to those of known related species, such as shrimp, crabs and lobsters. Its moisture content is around 80 per cent; as a percentage of dry weight, crude protein is 65.1, crude fat 14.2 and ash 13.9.

The composition of krill is, therefore, well balanced in terms of a potential foodstuff. As a pelagic crustacean, it has a higher moisture and fat content than bottom living species — and proportionately less crude protein.

While the protein content is both high and nutritionally excellent, the problems of separating the meat from the protective chitinous shell and other undesirable components has yet to be fully solved. The animal also deteriorates very rapidly when it dies, and "there are various discolouration phenomena."

In his report Grantham considers handling and pre-processing, raw material storage, sorting and grading.

Processing

There are numerous processing options (and he examines several of them). His conclusion is that no single process or product will predominate in the krill market. And there will be no unique solution to the problem of krill utilisation. Broadly-based process and product technologies will probably evolve, supported by diversified marketing strategies.

Processing deck in a freezer trawler. Plant for krill will probably be more complicated and more expensive.

The current state of the art in krill processing and product development indicate a movement away from the use of unprocessed and minimally processed krill for direct consumption. Materials such as coagulated paste and cooked mince, for example, are seen increasingly as intermediates for further processing.

But applications are limited to composite products containing relatively low proportions of krill, and of low tonnage potential. Grantham says that this is because most product development has been done ashore. The raw materials have had to be preserved by the catchers and so product performance has been reduced.

Further work is needed at sea or ashore on krill stabilised by methods that maintain its native properties. He particularly recommends the application of restructuring and texturising techniques to protein slurries obtained by pressing or bone separation from degutted krill.

Bulk peeling

The most significant developments in the field have been the applications of bulk peeling techniques. The highest value products from krill may well be based on shell-free intact tail meats. Two techniques presently show promise — frozen attrition and roller peeling.

Shrimp roller peelers have been used on krill in Chile in conjunction with the machinery makers, Laitram and Skrmetta. Japan is also understood to have used these machines.

Application of these techniques, says Grantham, offer the first opportunities to date for relatively high value mass marketed products based predominantly on krill.

It has also been shown that krill can be successfully reduced to meal for animal feeds.

Given a sufficiently high level of exploitation, krill meal production might be profitable. But it must be asked whether the material reduced to meal could be better used for direct human consumption.

Another factor to consider would be the effect on world feed protein prices of the uncontrolled reduction of vast amounts of krill to meal.

Summarising, Grantham observes that the technology of krill utilisation has advanced considerably during the past few years. As more countries go fishing krill, the technology can be expected to develop even more rapidly. Present indications are that krill products are moving towards the mass market outlets necessary for any significant exploitation of the resource.

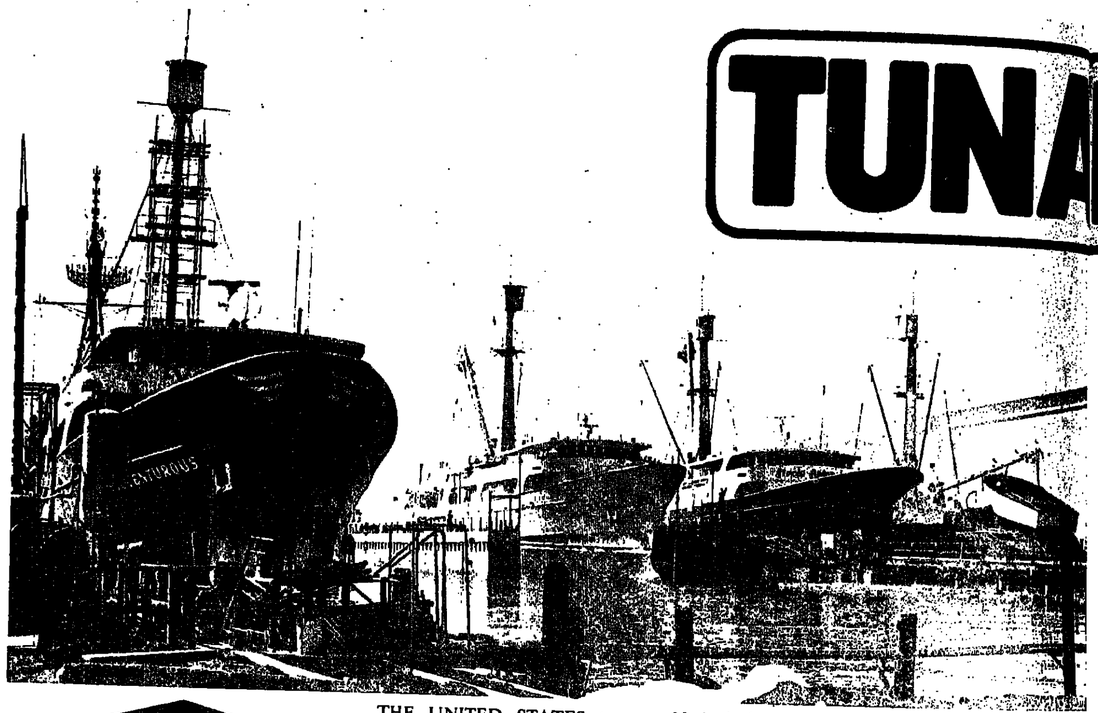
THE THREE REPORTS

THE REPORTS considered in this article were two of the three prepared specially for the UNDP/FAO Southern Ocean Fisheries Survey Programme. The Living Resources of the Southern Ocean was written by Inigo Everson, of the British Antarctic Survey. That on The Utilisation of Krill was written by G. J. Grantham, of Unilever Research.

With The Harvesting of Krill by G. C. Eddie, they are published by FAO, Via delle Terme di Caracalla, 00100 Rome, Italy.

TUNABOOM

San Diego to build 15 superseiners



Seen in the busy Campbell yard having their pre-season overhaul are the tuna super seiners Venturous, Calypso and Stacie Antonette. With demand for tuna estimated to be rising by 15 per cent a year, orders have been flowing into this California yard. These now amount to 15 ships to be built at a total cost of 75 million dollars.

From William C. Miller in San Diego

THE UNITED STATES tuna fleet based in Southern California and Puerto Rico is enjoying a good start to 1978. Early season catches are better than normal. Two purse seiners with capacities of 600 and 1,140 tons caught full loads of fish by the first week in February, and headed for the canneries where catches are bringing record high prices. And tunaboats are being built in San Diego for the first time in over a year.

But things are not all bright.

Although the porpoise problem has receded new troubles are looming in the Inter-American Tropical Tuna Commission. The IATTC runs the conservation programme for the eight member nations in the Conservation Yellowfin Regulatory Area (CYRA).

Mexico is threatening to form a new Commission and rewrite the rules in favour of Mexico, Costa Rica, Panama and Nicaragua, and to the disfavour of the United States, Canada, Japan and France.

The impact of such a move would probably not be felt until December when Mexico's withdrawal from the IATTC becomes effective. Potentially, it could close the 200-mile zones of the favoured nations to the others unless they agree to a new Commission with revised conventions.

But presently the good news outweighs the bad. The fleet started the year with a price rise from the canners who now pay $840 a short ton for yellowfin and $790 for skipjack delivered to the plants. Though only $10 a ton more than December's prices, they are $175 higher than in January 1977.

I asked Captain Ed Silva, executive vice-president of the American Tunaboat Association and himself a boat owner, if finances are still the problem they were last year when restrictions on netting yellowfin running with porpoise curtailed fishing.

"No, no problem," he said. "The canners are backing them. They want production."

The major underwriters are two big business groups — H. J. Heinz, parent company of Star-Kist Foods, Inc., and Ralston Purina, parent of Van Camp Sea Food Co.

Canneries

Star-Kist has a fishing fleet in San Diego and a cannery on Terminal Island, California. Van Camp prefers to own tunaboats in partnership with fishing captains. It has a new $23 million cannery in San Diego. Each has a plant in Puerto Rico.

Both companies, with a combined share of about 60 per cent of the market, expect gains in sales and profits this year. Spokesmen say a rise in beef prices will benefit them: When tuna is cheap relative to beef, especially hamburger, tuna consumption rises. Hamburger is already on the ascendancy.

US beef consumption averages about 125 lb. per capita, tuna about 2.9 lb. The canning industry would like to get tuna consumption back to its 1975 average of 3.1 lb.

Encouraging news for the fishing fleet is coming out of Campbell Industries' two shipyards where they are building 15 tunaships worth around $75 million.

Optimistic

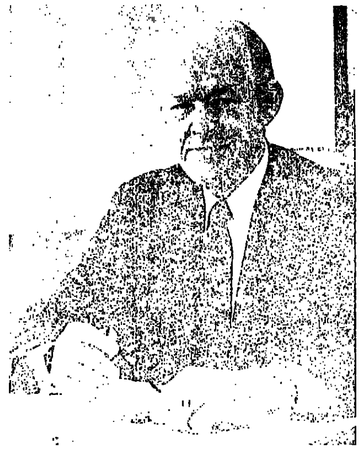
"Yes, I'm optimistic, I'm bullish," Campbell President Paul I. Stevens said.

The yards had not turned out a tunaship in over a year, and, "the financial world was down on the industry," Mr. Stevens recalled.

"Then sometime in mid-1977 we began to feel the turnaround, and all at once the industry began to want vessels, and the canners, the boat owners and the financial world found the means to finance them."

Of the 15 new superseiners on order, 10 are scheduled for delivery this year and the other five in 1979. Thirteen will be Campbell's standard 1,200-ton capacity seiner, 210 ft. (66.5 metres) long and costing $5 million each. The two others will be the 1,700-ton version, 252 ft. (76.8 m) long and priced above $7 million each.

At the age of 64, Mr. Stevens had had no experience in the tuna industry or in boatbuilding before December 1976 when the Campbell board called him to rescue the company from financial straits. But he came to Campbell with 40 years of manufacturing experience in aircraft, aerospace, graphic arts and printing plants.



He commissioned a market survey of the tuna industry to find out where it was going and the methods and sources of procuring tuna.

"The results indicated that the consumption of tuna throughout the world is rising at 15 per cent a year," he said. "I concluded that regardless of local problems (such as porpoise), there would be a solution forthcoming."

He decided it was up to the boatbuilders to find ways and methods to acquire tuna to satisfy the demand. He is not sure the present purse seiner method is "the ultimate solution," and so he is directing his engineers to improve vessel efficiency and technology.

Offset loss

The tuna fleet badly needs the new ships, commented Harold F. Cary, general manager of the US Tuna Foundation. "We just hope they will stay here," he added, "and offset the loss of about 15 modern seiners transferred to foreign flags." US porpoise restrictions were blamed for the transfers.

But the Mexican issue is seen as a more serious threat to fishing than the porpoise problem by an expert on the technology and economics of tuna fishing.

Biggest problem

Gordon Broadhead, president of Living Marine Resources, of San Diego, a marine consultant firm whose clients include the American Tunaboat Association, calls it, "the biggest single problem facing the industry."

The Mexican plans for a new Commission would give coastal states a preference in taking larger shares of the quota in the CYRA.

Mexico defines coastal states as countries that have coastlines adjacent to the tropical tuna fishery. Mexico, Costa Rica and Nicaragua also happen to be the four developing nations in the IATTC, and they want a larger share of the tuna catch. With their 200-mile fishing zones, they could block off a major part of the best tuna grounds.

"What we have here after 28 years of a successful Commission," said Mr. Broadhead, "is Mexico threatening to break up the ball game, and go it alone if we don't want to join their Commission."

He feels the outcome is at best uncertain. "This issue may or may not be negotiated. The final outcome is just not all that clear — where we're going to be able to fish. Mexico says that under a new management regime, we would be able to get our boats in their area." But at what price? he wonders.

The international tuna fleet last year caught 359,776 short tons of tuna, which is 80,537 tons fewer than the 1976 record.

CYRA catch

Landings within the CYRA totalled 319,099 tons, worth about $250 million at current dockside prices, according to Dr. James Joseph, director of the IATTC.

The bulk of the CYRA catch consisted of 201,417 tons of yellowfin and 88,341 tons of skipjack. Lesser species accounted for the rest.

In the area of the Pacific west of the CYRA boundary and east of Hawaii, the total catch was 24,162 tons.

The porpoise problem was blamed again when the US fleet's percentage of the CYRA catch dropped from 70 per cent in 1966 to 60 per cent last year. The US still had the main share — 191,141 tons. Mexico was second with 27,781 tons.

As *FNI* went to press, we were informed by Campbell Industries that the tuna ship orders have increased to 17.

In mid-1977 we began to feel the turnaround, and all at once the industry began to want vessels...

PAUL I. STEVENS, President of Campbell Industries

A NEATER PACKAGE...

THE FAO *Yearbook of Fishery Statistics* Vol. 42 departs only slightly from the previous volumes in the arrangement of tables. These are now as familiar as a well-worn pathway to readers who have used them year after year as the most comprehensive reliable record of the world's fish production.

But, while the tables may not have changed, the book itself is vastly different and greatly improved. By using tight setting of the computerised tables together with thin paper, FAO has compressed the mass of information in the Yearbook into a much more compact package.

It has also reversed the unfortunate trend in technical book publishing from hard to soft cover. The smaller pages are inside a sturdy hard-cover binding. The overall result is a Yearbook that gives the same information as it has always done, but presents it in a much neater, more portable and more convenient form.

TOP NATIONS IN 1976

In this table, the top 30 fishing countries are listed in order of reported or estimated total catches in 1976. We also list catches and places in 1975. These figures and places in the world catch league are based almost entirely on those given in Vol. 42 of the FAO *Yearbook of Fishery Statistics*. But we have made a few changes and additions to conform with the reality of worldwide fisheries rather than FAO definitions of countries . . .

Country	Catch in 1976	Place	Catch in 1975	Place
Japan	10,619,917	1	10,524,204	1
USSR	10,133,670	2	9,935,606	2
China	6,880,000*	3	6,880,000*	3
Peru	4,343,125	4	3,447,490	4
Norway	3,435,256	5	2,550,438	5
USA	3,003,901	6	2,742,703	6
S. Korea	2,406,685	7	2,133,371	8
India	2,400,000	8	2,328,000	7
Denmark	1,911,637	9	1,767,039	9
Thailand	1,640,396	10	1,552,984	10
Spain	1,483,162	11	1,523,092	11
Indonesia	1,448,000	12	1,381,614	12
Philippines	1,429,811	13	1,381,614	14
Chile	1,264,214	14	929,458	19
South and S. W. Africa	1,212,214	15	1,396,994	13
Canada	1,135,701	16	1,028,722	15
UK	1,050,722	17	979,717	18
Vietnam	1,013,500*	18	1,013,500*	16
Iceland	986,137	19	994,791	17
Brazil	950,000*	20	836,000*	20
Taiwan	900,000	21	779,000	24
France	805,925	22	805,785	21
N. Korea	800,000*	23	800,000*	23
Poland	750,072	24	800,737	22
Bangladesh	640,000*	25	640,000*	25
Mexico	572,285	26	499,345	26
Burma	501,560	27	485,140	27
Nigeria	494,767	28	478,216	28
W. Germany	454,440	29	441,711	29
Italy	420,278	30	416,974	30
WORLD TOTAL	73,467,000	—	69,893,100	—

*An FAO estimate, or repetition of figure for preceding year.

World catch moving up

FAO REPORTS FIRST BIG RISE SINCE THE 1960s

Frozen tuna in an Australian cold store. World catches are maintained.

AFTER HOVERING between 66 and 70 million tons a year since 1970, the world fish harvest rose by just over five per cent in 1976 to a new record total of 73,467,000 metric tons. This was more than 3.5 m. tons above the 1975 catch.

Details of the 1976 catch by species, regions and countries are given in Vol.42 of the FAO *Yearbook of Fishery Statistics*. The top 30 fishing countries who accounted for more than 90 per cent of the catch are shown in the table.

Contributing to the improvement were substantially higher catches by some major producers such as Norway and the USA. Also reporting improvements were Japan and the USSR, although the Soviet haul (a record 10,133,670 tons) was far below the figure of around 13 m. tons mentioned early in 1977 in news agency reports from Moscow.

The Peruvian catch, which had fallen to 3,447,490 tons in 1975, was boosted by a much better harvest of anchovy to reach 4,343,125 tons. But, as reported in *FNI*, 1977 was a disappointment for the hard-pressed fish meal industry with an anchovy haul only about half what it was in 1976.

In the United States, a menhaden catch of 925,000 tons helped to take the industry past three million tons.

Norway was also among the three-million-ton nations, thanks to her record harvest of capelin.

This small fish is now moving up to challenge the Alaska pollack as the species providing the largest volume of catch to commercial fishermen.

Not so many years ago, the capelin (*Mallotus villosis*) was so little known and underused that the FAO *Yearbook* lost it among the salmons and smelts in its tables. In this edition, it is moved to the tables for jacks, mullets and sauries. There the figures show that capelin from both sides of the North Atlantic in 1976 amounted to a record 3,362,863 tons, up from 2,248,150 tons in 1975.

Main catcher

Norway was the main catcher, with just under two million tons. Most of this was taken off her northern coast, although she also caught 23,178 tons in the north-west Atlantic off Canada. With 895,000 tons, the USSR is also becoming a major capelin fisher.

Iceland, the third major capelin fisher, took 450,000 tons in 1976. This was down on the 485,000 tons of the year before, but Iceland has more than made up for the drop with a huge rise in 1977 to 810,000 tons.

Added to a Norwegian catch of over two million tons, to the Russian catch and that of Canada and a few other smaller users, this Icelandic haul will have moved the 1977 total for capelin to around four million tons.

This could be close to the 1977 catch of Alaska pollack, which may have fallen from the 1976 peak of just over five million tons as a result of limits extensions by the USA and the USSR.

Fish merchant at Hull market. Britain took the brunt of the North Atlantic cod decline .

In 1973, when the pollack fishery was surging ahead on both sides of the North Pacific, Japan took three million tons of a 4.6 m. ton total. The Soviet share was nearly 1.4 m. tons and South Korea had 257,000 tons. By 1976 South Korea took 532,618 tons, the USSR 2,090,869 tons and the Japanese share had fallen to 2,445,083 tons.

Capelin and pollack are good examples of species that were once little wanted and relatively lightly exploited, until a need was created.

Those working to open up a fishery for the blue whiting (*Micromesistius poutassou*) in the north-east Atlantic have yet to demonstrate uses and a need as great as for capelin and pollack. But the FAO *Yearbook* shows that the catch is rising.

In 1973, Spain (18,800 tons) and the USSR (8,200 tons) were about the only countries sharing in a catch of 34,700 tons, although the Faroe Islands did catch 4,900 tons and Norway and Iceland were fishing the species. The catch rose to 54,603 tons in 1975 and then jumped to an estimated 108,190 tons in 1976.

By then the Russian haul was up to 27,000 tons and that of Spain 22,000 tons. But Norway's catch had gone up to 26,000 tons, that of Faroe to 14,000 tons, Poland 11,500 tons, and East Germany 5,000 tons. Blue whiting probes by the United Kingdom also brought her into the figures, with just over 2,100 tons.

While the FAO *Yearbook* reveals the rise into prominence of several new species, it also records what has been so grimly obvious to industries based on some of the more traditional species.

Herring plunge

Ten years ago, the North Atlantic herring was beginning its rapid plunge from near top place among the larger volume harvests. By 1973, it was just under two million tons (from well over three million tons only about five or six years before).

In the north-west Atlantic, ICNAF conservation measures helped towards the fall from 443,641 tons in 1975 to 322,000 tons in 1976. Within the total, the United States catch was the only one to rise — from 36,183 to 50,133 tons. That of Canada, at 225,000 tons, was around the average of recent years, but the USSR, West Germany, Poland, and East Germany saw their share plunge from 157,000 to 44,000 tons.

Across in the North Sea and north-east Atlantic, the decline has been even more pronounced — from just under 1.5 m. tons in 1973 to 856,045 tons in 1976. And in 1977 there was a further very substantial drop.

The herring resource is now yielding total catches probably less than a quarter of what they were in the peak years of the mid-1960s.

If we recall all that has been said and written in recent years about the deteriorating state of Atlantic cod stocks, the figures in the FAO *Yearbook* are surprising. The cod catch reached its peak ten years ago when it was nearly 3.9 m. tons. By 1971 it had fallen to 2.8 m. tons and in 1973 it was 2.54 m. tons. In 1975 it was 2.43 m. tons and in 1976 an estimated 2.38 m. tons.

From these figures it might be inferred that the conservation measures are beginning to have their effect. But there are some significant changes in who is getting the cod.

First, as they have tightened their claims, the coastal countries have been increasing their share of the catch. Thus Canada has moved up from 176,700 tons in 1973 to 193,550 tons in 1976 (but in the record year of 1968 she caught 323,100 tons), Norway increased from 309,200 to 390,355 tons and Iceland from 236,600 to 283,964 tons.

With a few exceptions, several of the countries fishing in the north-east Atlantic region have been more or less maintaining catches.

If we look closely at the figures for the European Economic Community's Atlantic fishing countries, we find that the drop in total catch is relatively less than the overall cod fall between 1973 and 1976. In the north-east Atlantic it went down from 659,000 tons in 1973, to 634,000 tons in 1976, a fall of 3.8 per cent. In the north-west Atlantic, the fall was steeper from 101,600 to 72,000 tons.

Most EEC members experienced more drastic declines in cod catches in 1977 as the widening limits bit deeper into traditional catching areas. But, for the worst affected EEC country, the cod decline was a grim reality already evident in the *Yearbook* figures.

Tuna harvest

Between 1973 and the end of 1976, the United Kingdom cod catch has gone down by over 21 per cent, from 323,000 to 254,000 tons. And in 1977, as we reported in *FNI* in February, it slumped to only 146,000 tons.

The figures for tuna, another highly-valued species, cannot be briefly analysed because they are spread over so many countries working a vast ocean range.

But, after all the reports of the growing interest in skipjack and albacore, larger catches are now beginning to reveal themselves. The skipjack total catch fell from the 635,540 tons of 1974 to 510,991 tons in 1975, due largely to a fall in the important Pacific western central area. But it was up to 643,000 tons in 1976.

The Japanese are ubiquitous and dominant in this widespread fishery with a 1976 catch of nearly 330,000 tons. But other countries are rapidly increasing their skipjack catches — the USA from 18,400 tons in 1973 to 62,840 tons in 1976, the Philippines from 3,200 to 22,596 tons.

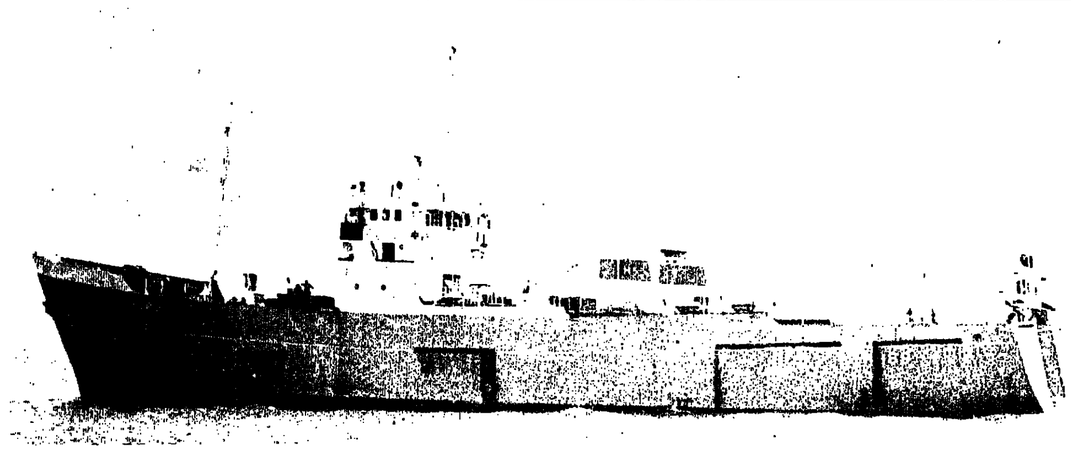
The albacore catch also went down between 1974 and 1975, but rose from just below 200,000 tons to 237,000 tons in 1976.

Of the larger species, the southern bluefin catch was again well below the peaks of around 50,000 in earlier years, with a total of 33,221 tons.

The yellowfin catch rose over the wide range from an estimated 474,000 to 527,000 tons.

Pole fishing for tuna off the coast of New South Wales

WIDER LIMITS BOOST FOR AUSTRALIA'S FISHERIES



● The British freezer stern trawler 'Othello'—one of three now fishing off Australia

THE PROSPECT of 200-mile fishing zones has stimulated significant expansion in trawl fishing off Australia. There is also growing interest in pelagic and squid fishing.

Looked at in production and export values, reports *FNI* correspondent Peter Pownall, fishing has become one of Australia's fastest-growing primary industries. In 1966/77, there was an output of 197,000 metric tons of marine foodstuffs worth about A$190 million. In the previous year, the value was A$142 million.

from an FNI correspondent

Exports rose from A$83 m. to A$144 m. And the expectations are that the current year will produce similar figures.

One of the most interesting of recent developments in fisheries has been in Western Australia. There, Australians have become involved in a joint venture with British United Trawlers, largest trawling group in Britain and one of the largest in the world.

From the venture, a trawling and processing company — Southern Ocean Fish Processors — has been formed to exploit virgin deepwater grounds in the Great Australian Bight.

Hull trawlers

Three former Hull-based freezer stern trawlers of the *Othello* class have been sent out to take part in the venture. The first of them, the *Othello*, arrived late in 1977. In her first voyage of 53 days she caught 200 tons of fish for whole freezing aboard.

The *Othello* has been followed out by her sister ships *Cassio* and *Orsino*. Built on the Clyde in 1966 and 1977, these whole fish freezers are 224 ft. (68.3 metres) long overall with a moulded breadth of 11.9 m. Freezing of the catch is done in ten vertical plate freezers with an output of nearly 30 tons a day.

Two refrigerated holds have a capacity for 765 cu.m. of frozen product.

Three other former British side trawlers, which were already in the joint company's base port of Albany, are also working in this project.

Government chartered exploratory fishing vessels have defined new deepwater trawl grounds in eastern Bass Strait. Squid resources off south-east Australia are being assessed by a Japanese ship with Australian observers aboard.

In New South Wales, a number of vessels (including tuna boats) are being converted to otter trawling. New vessels are being built or planned.

Purse seining for pelagic fish is coming back into popularity in the southern states; and intensive research into jack mackerel (*Trachurus declivis*) is being conducted in south-eastern waters.

In the northern prawn fishery, restrictions have been placed on the number of trawlers licensed to fish there. At the same time long-term management plans are being worked out in conjunction with an extensive research programme into the banana prawn (*Penaeus merguiensis*). This prawn provided 6,000 tons of the 9,500 prawn catch in the Gulf of Carpentaria.

A reasonable year is expected for the important rock lobster industry. Prices to fishermen for the 1977/78 season opened at a record A$5 a kilo.

The international market for Australian prawns is also expected to remain buoyant. But, as noted in *FNI* last month, abalone prices have fallen.

Finfish prices

It is anticipated that wholesale fresh and frozen finfish prices will continue to increase in 1978. In Australia, record prices were received for most finfish species in 1977.

These prices increased in line with those of imported fresh and frozen finfish. At present between 50 and 60 per cent of finfish consumed in Australia is imported.

Local and export prices for tuna were buoyant at the end of 1977. The 1977/78 season opened with a cannery price of A$450 a ton for frozen tuna landed at Eden, New South Wales. Tuna fishermen also received up to A$700 a ton for fish suitable for the Japanese sashimi market.

RUSSIA: A time for change

One important fishery not affected by the limits claims of other countries is that for small shoal fish in the Caspian Sea . . .

Search goes on for new supplies

By ALEXANDER BOGDA

Director of the USSR Fisheries and Oceanology Inst

A MODERN trawler with a crew of 70 can land 10,000 tonnes of fish a year, but can the ocean's resources withstand such intensive fishing? According to Soviet forecasts, the potential world catch can be 90 to 100 million tonnes a year. The present catch is already moving close to this.

Yet, while there are signs of the depletion of some valuable stocks where fishing is intensive, in the expanses of the ocean there are areas where commercial stocks are not sufficiently exploited. Catches of certain species of tuna, shark, anchovy and other fish could be considerably increased. Fishing at great depths also holds great promise.

Soviet expeditions are planned to map out new fishing areas in the Pacific, and the prospects of deepsea and wider-range fishing are being intensively studied.

About 90 per cent of the world's catch is obtained from a relatively small shelf area. The extension of national fishing zones to 200 miles restricts the use of the most productive areas. Yet biological resources within the zones must be effectively utilised, and if a coastal country does not yet have the possibility of exploiting them to the full it should be given all-round assistance to develop them.

For its part, the Soviet Union is negotiating agreements with a number of countries on co-operation in sea-fishing, envisaging the rational use of the resources in these zones. Such agreements have been concluded with, among others, the USA, Canada, Japan, Norway, Sweden, Angola, Mauritania, and Sierra Leone, making it possible for its fleet to continue fishing in their coastal waters and ensure the stability of the fish catch.

Bearing in mind that rapacious over-fishing can upset the balance of nature, the USSR plans the size of catches in accordance with scientific forecasts made by its National Institute of Fisheries and by institutes for specific species and fishing basins.

The forecasts are drawn up with a view to reproduction and stable restoration of stocks. Methods of defining sizes of stocks of food fish have been improved and are being applied with success.

Krill study

Hundreds of Soviet research and shoal-detecting expeditions to different regions of the world ocean have yielded considerable results. They have added many different species to the assortment of available fish food.

Fifteen years ago a study of Antarctic krill began, and its stocks have been established as allowing future annual catches of tens of millions of tonnes. Methods of obtaining food products from krill have also been developed.

Inland fisheries are being constantly expanded. The USSR has about three million lakes, including 280 big ones with a total area of over 62.5 million acres, and 375,000 miles of rivers of importance to fishing.

Sturgeon catch

Fifteen million acres of impounds have been created on the Volga, Dnieper, Don, Syr Darya and other big rivers.

There are 150 hatcheries and spawning and breeding ponds annually producing thousands of millions of fry for water bodies. Thanks to this, the catch of sturgeon, for example, reached 28,000 tonnes in 1976.

Carp are bred in 280 state pond farms. Promising species for pond farming are plant-eating fish — the Amur fish and the gruss carp, which already account [illegible] of the pond fish bred.

Commercial [illegible] been increased by acclimatising Pacific humpback salmon [illegible]its Sea and the North [illegible]eelhead salmon in the basins of Azov and Baltic seas.

Acclimatisation [illegible]chatka crab in the Barents [illegible]come a practical proposition, [illegible]brid of the beluga and sturgeon, has been evolved and [illegible] in fish breeding.

Full-cycle farms [illegible]reeding are operating in the [illegible] ponds and nurseries are [illegible]attening trout and Atlantic [illegible] commercial weight. And [illegible] centre for breeding grey mullet [illegible]en built in the Black Sea, [illegible] work is underway on [illegible]ps, and oyster and mussel [illegible]been set up both on an [illegible]al and commercial basis.

ABOVE: The Soviet Union now has 150 hatcheries, raising over 40 varieties of food fish. Among them is the giant beluga sturgeon. Here, workers in a hatchery in Azerbaijan inject a beluga to advance the maturing of its caviar.

LEFT: The Ushkov hatchery on Mamchatka, in the Soviet Far East, rears more than 14 million sturgeon fry a year. Warmed by hot springs, the waters of the lake do not freeze in winter. The hatchery also raises Pacific red and chum salmon which these workers are gathering for spawning.

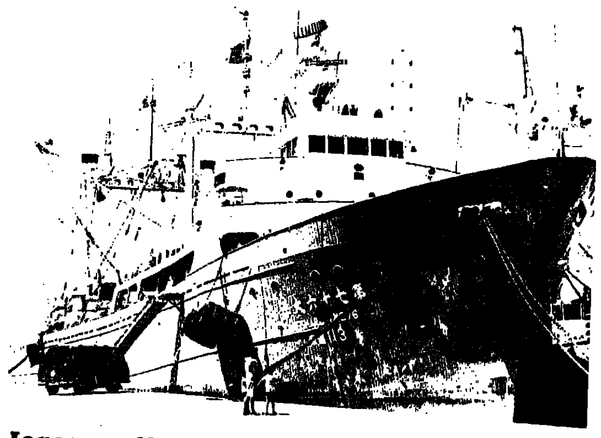
CATCH MAY TOP JAPAN

THE RUSSIAN catch is remarkable as much for its variety as for its volume. More than 150 species of fish, crustaceans and molluscs made up the record haul in 1976 of 10,133,670 tons.

Second only to Japan among fishing nations, the USSR may have been less affected by the restriction on distant water fishing through 200-mile limits. She may therefore have moved into top place in 1977.

In their ocean-ranging operations her ships take great quantities of the most abundant species. As Alexander Bogdanov notes, a modern trawler can land 10,000 tons a year. And Russia deploys a fleet that includes some 750 stern trawlers larger than 2,000 gross tons.

During 1976, these trawlers plus the big factory vessels and hundreds of smaller ships had catches which included two million tons of Alaska pollack, nearly 300,000 tons of Cape hake, 420,000 tons of Atlantic redfish, 467,000 tons of Atlantic cod.



Japanese distant water trawlers such as this are providing three million tons of Japan's fish supply; but where will they go now?

JAPAN FACING A FISH FAMINE

OVER THE five-year period 1972-76, the Japanese fish catch has averaged around 10.6 million tons a year. It reached a peak 10.8 m. tons in 1973 and in 1976 was almost on the average, at 10,619,917 tons. This average has been maintained despite increasing difficulties facing Japanese vessels in their important distant water areas. But figures for 1977 and even more so for this year may reflect loss of access to important resources.

Fish products are vital to the Japanese food supply. They account for half the daily intake of animal protein and some 15 per cent of household food expenditure.

The spread of 200-mile fishing limits has fundamental implications for Japan's food supply. Curbs already apply to waters from which more than a third of Japan's catch has been taken.

One view of this is that Japan will be able to make up any loss due to these developments in a relatively short time through more intensive fishing in her own waters and on the open sea, and through fish culture and ranching.

In August 1977, Japan applied her own 200-mile zone and extended her territorial waters from three out to 12 miles.

Three groups

The first of her three main groups of fishery activities — coastal fishing — takes place mainly within the 12-mile limit. About 150,000 operators had a catch estimated in 1976 at just over two million metric tons.

Her second group — offshore fisheries — are done mainly in the new 200-mile zone. About 10,000 operators took 4.64 m. tons in 1976.

It is the third group that has been most severely hit by the limits extensions of other countries. By 1976 the catch had already fallen about 200,000 tons from 1975, to just below two million tons.

The vessels working outside have not all been big trawlers run by giant companies, or roaming tuna ships. Particularly hard hit by the USSR extension of limits out to 200-miles in the Soviet Far East have been the so-called "hokuten" boats, which traditionally worked out of Hokkaido into distant North Pacific grounds.

More than 150 vessels were involved, and 57 were pulled out of North Pacific trawling. One use seen for them was to take over the Soviet sardine catch of around 100,000 tons in the zone between three and 12 miles.

But Japanese coastal sardine fishermen were violently opposed to this.

Another use, already reported in *FNI*, is in the Southern Ocean, fishing for krill.

Of the fish taken by Japan in 1975 from areas now covered by foreign 200-mile Zones, 1,410,000 tons came from off the coast of the United States and 1,396,000 from off the USSR.

Alaska pollack made up the bulk of this catch. It is the much-sought raw material for minced fish (surimi) from which many processors make kamaboko. And about 70 per cent came from waters now within US or Soviet jurisdiction.

In 1977, Japan was allowed a quota of 836,000 tons of pollack from the US zone (about 20 per cent less than the 1975 catch). From the Soviet zone she was allowed 100,000 tons in June-December 1977, a cut of 62 per cent.

Imports needed

Altogether, the 1977 Japanese pollack catch fell some 30 per cent or 818,000 tons from the 1976 catch. And this was already well below the peak catches.

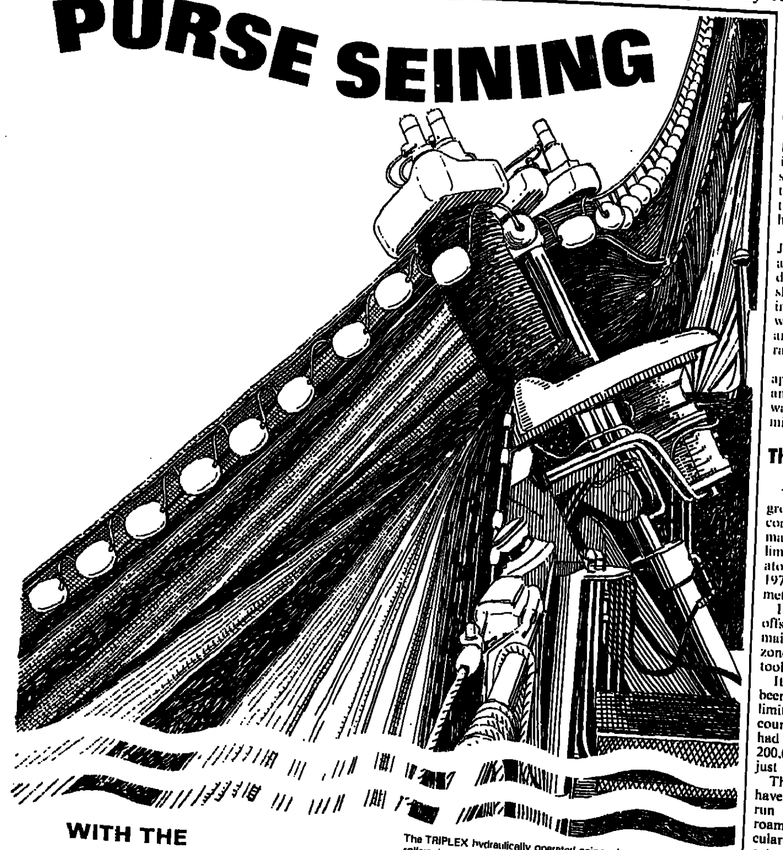
There is some justification therefore for another view in Japan — that the country will become more dependent on imports of fish and meats. It may also have to turn more to grains and soya meal to nourish domestic livestock as fish meal production declines.

This seems to be the likely short-term possibility since Japan is going to need time to boost her catch back.

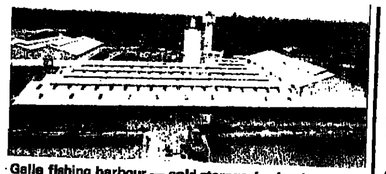
PORTS & MARKETS: Page 36

Door slams on high seas fleet

PURSE SEINING



PORTS & MARKETS



Galle fishing harbour — cold storage for foreign ships.

Raw deal in Sri Lanka

A TEAM of Japanese businessmen led by S. M. Yoshida of the Japan Tuna Importing Association recently met Fisheries Minister Festus Perera to discuss the possibility of importing raw fish from Sri Lanka. The team was informed of the fish catch potential in Sri Lanka's waters. The prospects of exploiting these resources was thoroughly discussed.

Mr. Yoshida told the Fisheries Minister that they had a technique for airlifting fish from Sri Lanka without the use of refrigeration. They were prepared to set up a purchasing point in Sri Lanka, if fish could be made available for export.

According to *FNI* correspondent Nalin Wijesekera, the Fisheries Ministry is considering a proposal to allow foreign vessels to fish under licence in Sri Lanka waters and to make available the cold store facilities in the port of Galle.

Smoked fish

The Ministry is also making an all-out effort to popularise the processing of smoked fish. This follows a series of experiments carried out under the Industrial Development Board.

These tests indicated that properly smoked fish could be held without contamination for around 30 days, even without refrigeration.

Through the food section of its extension service, the Board says it is prepared to demonstrate the process to anyone interested. It will also support applications for loans from processors interested in venturing into fish smoking.

Fall in world meal output

WORLD PRODUCTION of fish meal fell just below four million tons in 1977 when the total was estimated at 3,985,000 tons. This was a drop of 9.5 per cent on the 4.4 m. tons of 1976, and was the lowest total since 3.65 m. tons in 1973.

Main cause of the decline was the slump in Peruvian production to only about 440,000 tons. This was a little over half that of 1976.

Meal production in Europe was up by more than 55 per cent to a total of 1,240,000 tons. Among the main producers, Norway's output rose to 475,000 tons and that of Iceland exceeded 150,000 tons. But Danish production dropped from 349,000 to 325,000 tons.

In North America, Mexico doubled her production to 80,000 tons.

Canadians form export group

COMPANIES in Canada have been setting up a new organisation which will help them find and develop overseas markets for fish exports. According to Ken Campbell, manager of the Fisheries Council, the new body will be known as the Canadian Association of Fish Exporters (CAFE).

At the same time the Canadian Trade Department is to appoint fish attaches for Japan and European countries.

"The demand for fish exports is strong," said Bob Werner, head of the Trade Department's Fish Division.

But fish markets go in six-year cycles and "we need to put things into place now to avoid the sort of problems which have hit the industry in the past." The way to do it, he added, is to create permanent markets for Canadian produces.

Mr. Campbell said that many companies would be joining CAFE, which would be a sister organisation to the Fisheries Council.

CAFE is expected to supply the Canadian companies with a steady flow of information on international fish markets and prices.

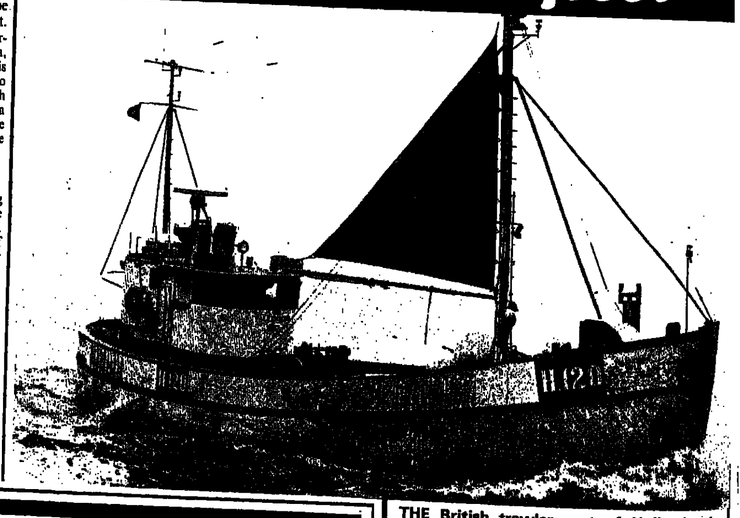
Canada's Trade Minister Jack Horner is reported to be considering a proposal to appoint people from the fishing industry as attaches in major overseas markets.

At present, commercial attaches in 40 countries are responsible for the job. But after the 200-mile limit came in last year the government appointed fisheries representatives in seven countries.

Mr. Werner expects the next long cycle in fisheries in 1982/83, and his department would like to see the marketing system strong enough by then to protect the Canadian fishing industry.

"The companies are showing excellent initiative by working together to set up CAFE," he said. "They are competing against centralised selling in other countries such as Iceland and Norway."

Hull loses seiner fleet



THE British trawler port of Hull, already suffering from the decline of its deepsea fleet, is to lose its small fleet of seine net boats.

The ten vessels — including the *Falkenborg* (above) — owned by Boston DeepSea Fisheries have been sold for about £1 million to the Grimsby firm, Consolidated Fisheries. According to Boston deputy-chairman Neil Parkes, the move is a result of the critical position Hull is running into as a fresh fish port.

Boston has operated seine netters out of Hull for the past 20 years.

French trade gap widens

FRENCH import-export figures for the fish trade are expected to show an adverse balance for 1977 of around 2,400 million francs, 20 per cent up on 1976.

This estimate, reports *FNI* correspondent Henry Kahn, is based on figures for the first eleven months of 1977 which already revealed a deficit of 2,015 m. francs.

Few hopes for 1978

Imports for the period amounted to 324,484 tons against only 85,597 tons exported.

There are few hopes for an improvement in 1978. Many French vessels have been hit by extensions of limits. For example, they are no longer allowed to fish for saithe off the Faroe Islands.

Crushing victory

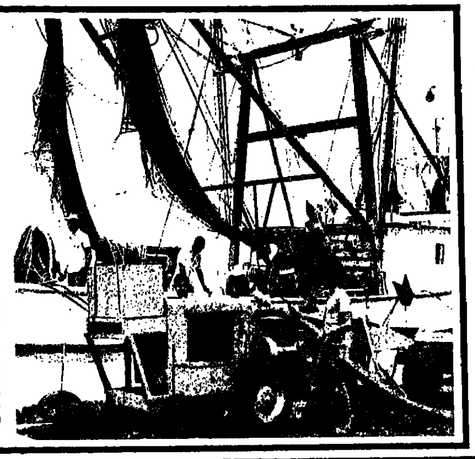
HOW DO you keep a trawler's shrimp catch fresh when its hold is not electrically refrigerated?

This was the problem facing Booth Fisheries at its plant on Bluff Island a few kilometres from the Caribbean coast of eastern Nicaragua.

The only solution was for the hold to be packed with ice — but how do you do this when your ice is in large blocks? Obviously the large blocks must be crushed.

What then is the most efficient and economical way of crushing the ice blocks?

Booths Engineers designed their own ice crushing machine ten years ago. Today the machine, built around a four cylinder Perkins 4.236 industrial diesel engine, feeds up to ten trawlers a day, each with 15-20 tons of crushed ice (see picture).



£1m. factory for 'Clipper'

THE SCOTTISH firm Clipper Seafoods is to set up a new £1 million fish processing plant in Aberdeen. This will be on the site of a meal plant which has closed down and will be demolished.

Clipper is one of the fastest-growing fish firms in the UK. At a time when many processors have been cutting back, or seeking assistance, it is looking to a modern factory for the 1980s.

The company is headed by Dr. Francis Clark who moved into the Salvesen group with his former company Claben, but left them two years ago.

He then took over a small fish business in Aberdeen. This now has some 120 people handling fish at several British ports.

Clipper is selling its present 14,000 sq. ft. factory in Aberdeen.

CANNERY PLANS

THREE fish canning complexes, costing a total of US$225 million, are to be set up to serve three fishing areas in the Philippines. Behind the project, reports our correspondent, is the Emerald Seas Fishing and Development Corporation.

The proposed sites are Calapan in Oriental Mindoro province, and Daet and Mercedes in Camarines Norte province. Backing for the project will come from Norway, Sweden and Italy.

Hake port scheme is moving ahead

THE Wilh Wiese Fishery company is considering a $17 million development centred on the port of Coos Bay in Oregon on the United States Pacific coast. Included in the proposal is a $5 million processing plant and four 150 ft. (45.7 metre) long trawlers that would be built locally at an estimated $3 million each.

The proposal has been made to officials of the Port of Coos Bay by WWF President Owen Stolpe. It came soon after the port had released the results of a study to determine how it could participate in and the expected growth of a west coast hake fishery (see *FNI* November 1977).

A firm of engineering consultants has been employed to develop a design for a fishery industry complex on part of 284 acres of land owned by the port and zoned for factories.

Has outlets

According to Mr. Stolpe, his company has outlets for the fish that would be supplied into Coos Bay.

"It would not be a case of opening a new market," he said, "but one of filling our backlog of orders."

The company's American headquarters are in New Bedford, Massachusetts, and its international base is London. It markets herrings, anchovy and hake throughout Europe.

New jobs

For Coos Bay, the project could create 800 jobs in two shifts in the factory, and another 100 for trawler crew. Construction of the ships would lead to expansion of the local engineering industry.

But the largest benefits could be to local fishermen. They have long struggled to survive among rich resources, simply because of the small outlets and hence low prices for their catches.

A hake by any other name

PRODUCT researchers in the United States, seeking to develop the food use of North Pacific hake *(Merluccius productus)*, are looking for a better market name for the fish.

Reporting this in a recent monthly report, the Northwest and Alaska Center of the National Marine Fisheries Service says the name proposed is "Pacific whiting."

"Whiting"

The hake resource is of most interest to the fishing industry in the west coast states of California, Oregon and Washington. There, processers and marketers of fresh and frozen fish generally agree that "whiting" is the preferred market term.

This has been long used for the related silver hake *(Merluccius bilinearis)* and, more recently, for imported southwest Atlantic hake *(Merluccius hubbsi)*.

These and the South African or Cape hake and Chilean hake are all of the genus *Merluccius*. But, under US Food and Drug Administration regulations the industry must formally request and justify the use of "Pacific whiting."

PORTS & MARKETS

Crab—Swedes can't get enough

UK SEEN AS MAIN SUPPLIER

TO MEET the demand for crabs, Swedish importers are looking hard for more supplies.

Traditionally, crabs are eaten in Sweden between August and November. This is the time when the crustaceans are best available in Swedish waters.

But, with imports, the wholesalers are hoping to persuade Swedes to take crabs all year round.

At present most of the imports come from Britain, Ireland and Norway. But wholesalers are looking further.

They require the crabs vacuum packed and sterilised. In this form, the Swedish market is now taking 900 tons a year.

Home demand

The supply from Norway has been drying up because of smaller catches and increased home demand. For the immediate future, the British Isles are seen as the main source.

Encouraged by their sales, merchants in Britain and Ireland feel that the demand for crabs packed Swedish-style could spread to other countries.

The main consignments from Britain come from the Devon and Cornwall coasts of south-west England. And there are considerable untapped resources along the Welsh coasts, too.

Taiyo joint prawn deal

THE TAIYO fishing group of Japan is reported to have been setting up a joint prawn venture in Bangladesh in February. The group is also working towards a joint venture in New Zealand later in 1978.

Another Japanese company, Nippon Suisan, is to set up a deepsea fishing company in Chile.

The prawn venture will open with a capital of 88.2 million yen (about £200,000). Taiyo will have a 30 per cent interest, the trading company Mitsui will have 30 per cent and Bangladesh interests 40 per cent.

Three 150-ton prawn trawlers are to be built for the joint company in Japanese yards.

In New Zealand, Taiyo is planning to charter trawlers to a local company with which it will establish a joint venture.

The Nippon Suisan company in Chile will be set up at a cost of about US$2.3 million.

Exploratory trawling in Chilean waters is reported to have been encouraging. And a recent policy change by the Chilean government makes it possible for a company to be set up to operate ships inside the 200-mile limits.

All the fish she needs

THE Norwegian Haride International group is reported to have begun negotiating the setting up of a joint venture in Sri Lanka.

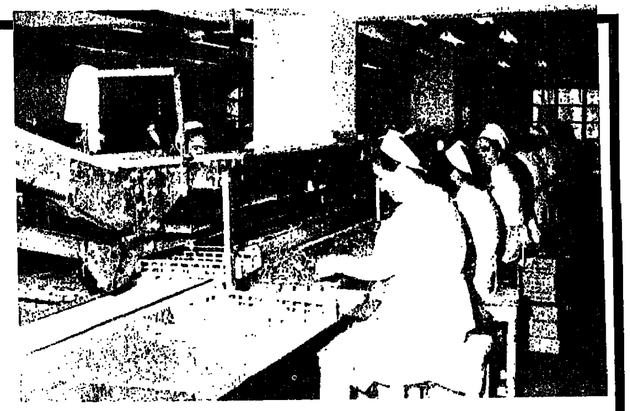
Mr. John Glaver, president of Haride International told *FNI* correspondent, Nalin Wijesekera, that he was most anxious to begin working with counterparts in Sri Lanka, after a survey of fish resources around the island.

Local fishermen would not be affected as the project is intended to operate outside 50 miles.

If the project is successful, it would be possible to provide Sri Lanka with all the fish she needs, and the rest could be exported by the joint venture company.

Inside La Monegasque anchovy cannery in Monaco. Women fillet and pack the tiny fish before machinery takes over.

CANNERY WIDENS ANCHOVY SEARCH



Demand up but supplies down at Monaco firm

THE WORLD'S largest anchovy processor is having to look further afield for supplies.

The firm La Monegasque, based in Monaco, used to gets its fish from nearby French and Italian harbours. Now anchovies are being brought in from the French west coast and from Yugoslavia. Additional supplies are imported from South America.

This widening buying area is only partly due to a fall-off in local catches of anchovy. Another factor is the expansion of the firm to meet growing demand.

La Monegasque is one of the major industrial activities in the small Mediterranean principality. It processes about 12 tons of anchovies a day and employs more than 400 people.

The fish usually comes in by lorry, packed in barrels of brine. All sorting and preparation is done carefully by hand because of the delicacy of the fish.

Once they have been washed, filleted and packed in tins, the rest of the processing is by machine — sealing, seaming and retorting.

Another feature of this Monaco factory is the variety of sizes and types of cans and jars it produces.

Some new products

More than two tons of olive oil are used daily to fill the packs.

Among the new products developed by La Monegasque are smoked anchovies, which are finding a ready market. To diversify in its fish as well as its packs, it has started packing quality sardines.

The firm's wide outlets extend to markets in North America, over much of Europe and to the Near and Far East.

Each year it packs more than 24 million cans of anchovies. But, with supplies becoming difficult, this could be around the peak and production could be levelling off.

Shrimp trade grows fast

EXPORTS of frozen shrimp from India's Andhra state have been rising significantly, reports *FNI* correspondent Trevor Drieberg.

As an example of this expansion, exports in the nine-month period April-December 1977 were 2,545 tons, compared with 1,893 tons in the same nine months of 1976.

Japan and the United States were the main markets.

Another trade that could grow is the export of spiny lobster tails, which rose from four tons to 12 tons.

The rapid growth of Andhra seafood exports in the past two or three years is attributed to increased trawling along the coast. This is mainly in inshore waters.

On the other hand, development of offshore and deepsea fishing has been slow, to say the least. But about a dozen private seafood exporters (and the state-owned Andhra Pradesh Fisheries Corporation) are working from the major port of Visakhapatnam and the minor port of Kakinada.

Andhra shrimp exports may exceed 3,000 tons in the current fiscal year, which ends this month.

'Handsome!'

NATURAL fillet strips from top quality cod are being marketed in the United States by Frionor of Norway.

The strips are graded eight to 12 oz with an average fillet weight of 10.5 oz. They are skinless and boned.

"They make a handsome individual serving," says Frionor, "that will command a higher-than-usual menu price. They are also excellent when cut in smaller pieces and batter fried."

canned tuna exports

FOR THE first time, canned tuna has been exported from an Indian factory.

The cannery is at Mincoy in the Lakshadweep island chain in the Arabian Sea. The consignment — of 4,000 cartons — went to Britain.

This new export was initiated through the marketing division of the Lakshadweep administration. The order came from a leading British importer through Mermaid Foods in Calcutta.

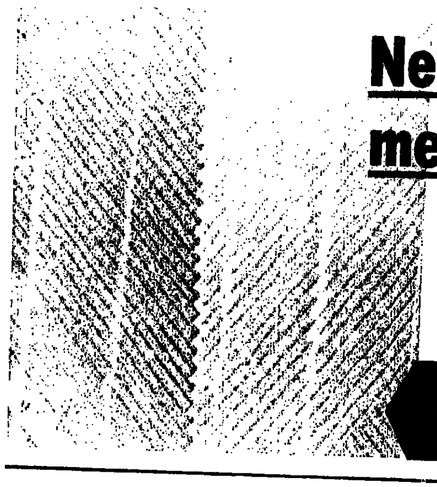
A market survey recently carried out by the Marine Products Export Development Authority (MPEDA) put tuna among India's high-potential species for export.

Reduction plant for Oman

A DEEPSEA fishing concession held by two Japanese companies from Oman has been awarded to the Korean Overseas Fishing Company.

The South Koreans have agreed to set up a fish meal factory which will require no capital investment by the Oman government. Thirty per cent of the catch and a 60 per cent share in the meal plant will go to Oman.

This is the first such deal between Oman and South Korea. It came into effect in the middle of January.



New lightweight GRP hulls mean faster, cheaper boats

by Dag Pike

A NEW METHOD for the construction of ultra-lightweight glass fibre hulls being developed in Denmark could lead to the widespread use of fast fishing and workboats without any marked increase in fuel consumption.

Lightweight construction has always been the aim of the designers of fast boats but is normally only achieved at considerable expense. But the cost of the new system is comparable to present standard laminating methods.

High quality laminate obtained by the new wind-on technique

Hull and deck are moulded together over a former which is mounted at each end so that it can rotate. It is geared to a carriage which traverses the length of the former. Mounted on the carriage are reels of glass thread and a resin tank. The threads are impregnated with resin as they leave the carriage and wound spirally into the former as it rotates.

The threads are applied in a band about 2 cm wide and as the layers build up they are interwoven to produce a very strong laminate. A slow curing resin ensures a good bond between successive layers.

Much of the strength of the finished laminate is in the high glass content, 50-60 per cent compared with the normal 30 per cent. Thre is also no chance of air bubbles forming or of poor impregnation with resin so that a consistent high quality of laminate results.

Once the resin has cured, the former is removed through a hole cut in the deck for the cockpit or engine hatch.

GRP 'planks'

A development of this system sees the former being covered with extruded hollow glass fibre 'planks'. These lightweight 'planks' will remain inside the hull giving increased rigidity and a high quality interior finish. With re-usable frames, this method of construction will be largely automatic once the former has been set up.

The only limit on size for this type of construction is the machinery itself, and this can be made to cope with 100 ft (30.5 m.) hulls without difficulty.

The system is equally suited to a carbon fibre laminate or to a combination of various fibres to get the required strength characteristics in the hull.

A saving

While lightweight is required for high speed, the system is equally suited to displacement hulls. It achieves a saving in materials which keeps costs down and the light weight of the hull can be used to increase the payload.

The hollow planks incorporated into the hull give good insulation against both heat and noise and on patrol boats the enclosed spaces could be used to contain Kevlar-based armour plating.

In addition, the enclosed air spaces give the boat hull a positive buoyance and increased protection in the event of collision.

This new system is equally suited to one-off or production line construction. It promises to bring about a considerable revolution in boat construction and could give laminate construction a big advantage over its competitors, wood, steel and aluminium.

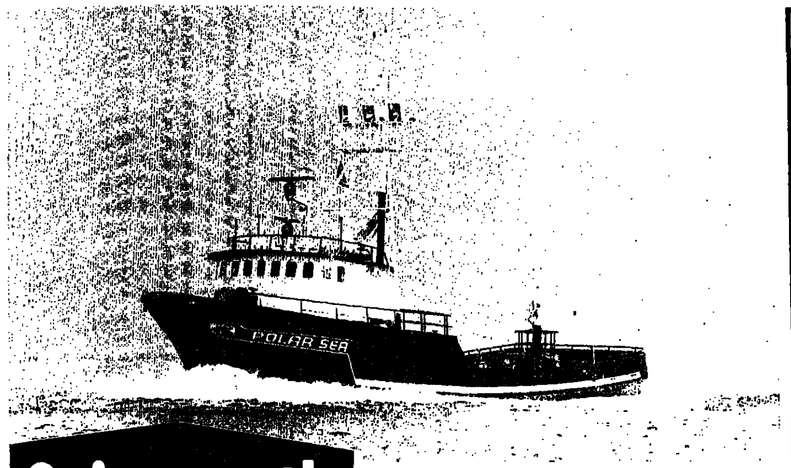
It is particularly relevant in factory boat production where a tightening up of the moulding conditions is making life difficult for GRP fabricators.

From Florida yard

THE FLORIDA, USA boatyard Atlantic Marine Inc. has delivered an 83 ft. (25.3 metre) long steel-hull stern trawler to Frank Oliviera of New Bedford, Massachusetts.

Named *Manny and Christina*, the boat is powered by a Caterpillar 3412 engine developing 520 hp at 1800 rpm. Auxiliary power is provided by a generating plant driven by a Lister air-cooled diesel engine.

Designed by John W. Gilbert & Associates Inc., the *Manny and Christina* has a beam of 22 ft and a draught of 12 ft.



Going north with 100 pots

COMPLETED in January, the *Polar Sea* is the first of a new series of intermediate-size 97 ft. (29.6 metre) long combination fishing vessels from the Seattle yard of Marine Construction & Design Co. (Marco). Her principal owner, Captain Vidar Warness, took his new boat north in February after loading 100 crab pots. Off the Aleutians and in the Bering Sea, he is now fishing for tanner crab for the rest of the season, probably into June.

Dutch Harbour

Catches are delivered to the Vita Food Products processing plant in Dutch Harbor.

Two fish holds of 6,000 cu. ft. (170 cu. metres) capacity can take up to 140,000 lb. (63,600 kilos) of live crabs.

The main engine is a turbocharged and aftercooled Caterpillar D398 diesel developing 850 bhp continuous at 1225 rpm and turning a Coolidge three-blade stainless steel propeller through a Caterpillar 7251 hydraulic reverse/reduction gear. The ship is also equipped with two Caterpillar 3304 engines driving 95 kW generators.

Marco hydraulically powered deck machinery includes a KingHauler crab pot hauler and a double-acting pot dumping rack, a "picking" boom with Marco auxiliary winch, and a Marco anchor winch.

Transfer of pots on deck will be handled by a Rowe five-ton telescoping hydraulic crane.

Power for the deck machinery is through two Marco DPOI "HPD" hydraulic pump drives coupled to the two auxiliary engines.

Remote control consoles for the crane and boom winches are on the main deck and the fo'c'sle deck overlooking the pot storage area. A console with controls for the KingHauler and pot dumping rack is on the fishing deck.

Navigation and communication equipment in the *Polar Sea* includes two Northstar 6000 auto-tracking Loran C sets, two Konel/Furuno 64-mile radars, Krupp Atlas Echograph recording sounder, Raytheon DE 726 depth indicator, Sperry 8Tauto pilot, Raytheon 55-channel VHF telephone, Northern N550, SSB radio and N571 SSB auxiliary radio, Johnson 40-channel CB radio, Roberston WA 70K watch alarm and Executone 710 DKK three-station intercom.

Normal crew

When crab fishing, the *Polar Sea* will normally carry a crew of four to five.

She is the 28th vessel of 94 up to 121 ft. in length delivered by Marco since 1968 for crab fishing and trawling in the Bering Sea and North Pacific. A second 97-footer will be completed in March.

Blue whiting factory ship

AALESUND OWNER Inge Naero has taken delivery of the combinated trawler, purse seiner and factory ship *Poseidon*, designed by Skipskonsulent of Bergen.

Her cost is reported to be 31 million kroner (over £3 million). Mr. Naero estimates that the ship will need to earn 13 million kroner a year just to cover costs.

"The vessel will concentrate on capelin and blue whiting. The catch will be used "99 per cent," said her owner.

Her crew of 27 allows for two factory shifts and one fishing team. All the catch will go initially into RSW tanks. When the vessel is capelin fishing, this will subsequently be processed in frozen fish, fish meal and capelin roe.

Two loads of frozen capelin have been sold in advance for use as salmon feed.

Blue whiting will also be converted into meal. But there are also buyers for blue whiting fillets at 4.50 kroner a kilo. A filleting machine for blue whiting has therefore been installed.

Tasmanian maritime college

CAPTAIN D. M. (Danny) Waters, who grew up in a Scottish fishing village, has been appointed first principal of the New Australian Maritime College at Launceston, Tasmania. This college will train deck, engineering and radio officers for the merchant marine and the fishing industry.

Before his appointment, Captain Waters was head of the Marine Crews and Services Branch of the Australian Department of Transport, which was concerned with education, training and competency examinations for mariners.

In the United Kingdom, he lectured for eight years in polytechnics and universities. He was at sea for 13 years, reaching the rank of master.

LAKE NASSER PROJECT

NORWAY is to help Egypt in the development of fisheries on Lake Nasser. The agreement was signed in February in the Oslo headquarters of the Norwegian Agency for Development Aid (NORAD).

Lake Nasser was created by the building of the Aswan Dam and it now supports about 6,000 fishermen. Their methods of catching are simple and labour intensive.

Financial aid from Norway will be up to five million kroner (about £500,000). It will be used partly for training and technical assistance, partly for buying boats and equipment, and for resource survey. The project should be completed by the end of 1979.

Included in the assistance from Norway will be two small carrier boats 35 to 40 ft. long able to carry 10 to 15 tons. There will also be boats for experimental fishing. All of them are to be built in Norway.

Training of local fishermen in the use of the new types of boats, in catching methods and treatment of fresh fish will be a major element in the project.

Skipper N. Townsend explains trawl gear design and operation to Stephen Hunt and Brian Manship — two young 'deckies' working on the new certificate course.

Month to learn about engines

TWENTY-FOUR fishery officers from 14 countries are spending most of this month in Peterborough, England, learning all about marine diesel engines.

The officers are taking part in a one-year post-graduate course in England. The course is organised each year by the Ministry of Overseas Development.

This is the tenth year in succession that the students have been sent to the well-equipped Product Training School run by Perkins Engines at its factory in Peterborough.

The fishery officers on the present course come from Malawi, Burma, Sierra Leone, Belize, Kenya, Tonga, Malaysia, Kuwait, Indonesia, Nigeria, Zambia, Senegal, Ghana, and the UK.

There is one woman on the course. A BSc graduate in zoology and botany, Lynette Bradley is a government fishery officer in Belize.

The course gives intensive instruction in the use of Perkins marine engines in modern fishing craft. It is tailored to widen their professional experience before they return to their duties in the fisheries of their countries.

To provide maximum benefit, the intensive engine instruction in Peterborough is practical and theoretical. Subjects studied include inboard engine design, manufacture, operation, maintenance and repair.

NORWEGIANS IN HULL FOR NETS COURSE

FOR ONE-WEEK at the end of February, 24 Norwegians were at the English trawler port of Hull where they took part in a course on Materials and Net Technology.

They were from net making and assembly firms all over Norway. The course was based at the Conference Centre of Hull College of Higher Education. It was arranged in conjunction with the Norwegian Textile Institute in Bergen.

During the week, the visitors were instructed by staff of the college's faculty of Maritime and Engineering studies.

They took part in practical exercises involving the fishing gear flume tank at the college and its load testing laboratory.

Now a certificate course for deckhands

AFTER A ten-year struggle, the Grimsby College of Technology has succeeded in getting training in sea fishing practice accepted as an education course.

It has pioneered a City and Guilds Craft Certificate for the subject in this English trawler port.

Until this, fishermen were often thought to be wasting their time learning from books, said Captain S. G. Keene, head of the Department of Fisheries and Maritime Studies at the college. In education, they were second-class citizens.

The new course is designed for the young deckhand. The choice is from six main subjects — care and maintenance of engines, electronic equipment, hydraulic machinery, cooking, advanced network, and watchkeeping

Training consists of practical work with lectures in the college and it is open to anyone.

Specialist subjects are taken along with basic studies and gain the student an additional certificate.

Captain S. G. Keene — preparing for future needs.

The full scheme is intended to meet the changing structure of the fishing industry. It is thought to be flexible enough to keep up with the changes.

Captain Keene believes the new generation of British fishermen are going to have to be more versatile in their jobs than in the past.

"They will have to be prepared to work in a variety of ships with different fishing methods," he told *FNI*.

He hopes that skippers will allow their young crewmen to spend periods ashore obtaining the certificates that will make them more efficient at sea.

Present trainees are aged 16 and 17. Most have practical experience of some kind, or come from fishing families.

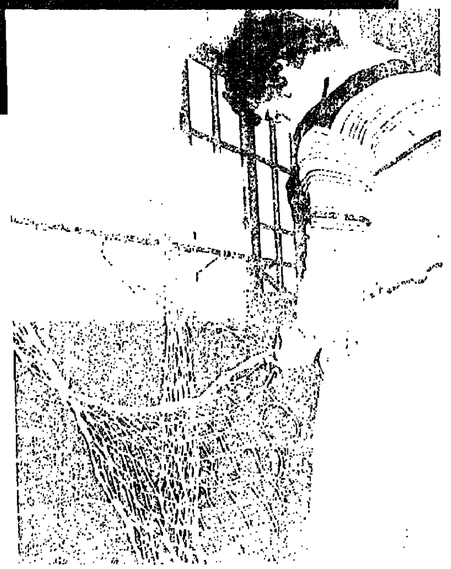
The college is also working towards a Technical Education Council certificate scheme for senior ship's personnel.

Skippers of the future will have heavy responsibilities for expensive boats, machinery and electronic equipment. Often no specialist engineers will be carried aboard, said Keene.

Responsible

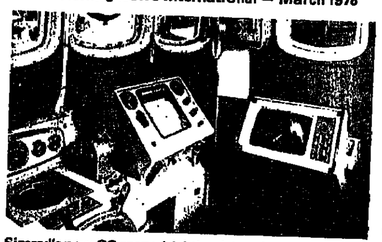
The skipper will be responsible for locating and catching fish from stocks protected for conservation. This requires an understanding of regulations and international agreements.

With his job becoming increasingly complex, he will need an education system developed for his new needs.

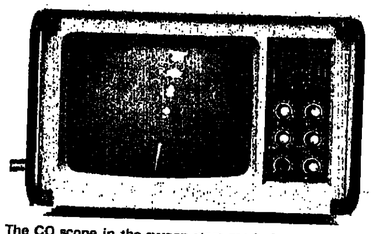


John Jones absorbed in braiding a shaped piece of net to the correct specification.

Better view for sonar users



Simrad's new CQ scope (right), with an SL sonar in a boat wheelhouse.



The CQ scope in the sweep start mode for seeking and closing up on fish targets.

SIMRAD of Norway has added a new cathode ray tube (CRT) scope which can be connected to its sonars SL, SK3, SB, SQ, ST, and SU.

The scope with its 12 inch screen "gives a superb overall view of the search and catch situation."

In addition to the sonar ranges, this CQ scope also has two shorter ranges, 0-150 metres and 0-75 m., which give a more detailed picture as the boat is catching its fish.

Memory

The scope can be used either as a slave or a master unit. One valuable feature pointed out by Simrad is the "one ping" memory. This gives the operator time to take a closer look at the echo registration, especially in the longer ranges, as the target is kept on the screen between each "ping."

Users of the CQ scope have a choice of three sweep modes:
1 Sweep start at the bottom of the screen for seeking and closing up on targets.
2 Sweep start at the top of the screen for controlling and observing the situation behind the vessel.
3 Sweep start in the centre of the screen for a typical purse seining situation.

The CQ has a built-in filter which removes unwanted echoes, such as reverberation. It eliminates interference from the sonars and echo sounders of other vessels.

Simrad is also offering a new line of ceramic transducers, "which will gradually replace the existing nickel transducers."

Higher output

They have the radiation areas and beam angles but the higher efficiency of the ceramic elements gives higher output.

The efficiency of a transducer is measured as a percentage to show how much of the electrical power output through the transducer is transformed into ultrasound energy in the water.

A comparision between the two types, says Simrad, shows that while the nickel transducers operate at about 25 per cent., the ceramic transducers will be capable of 50 per cent. An echo sounder with 500-watt transmitter output power and a ceramic transducer thus equals one with 1000-watt output and a nickel transducer. For the fisherman, this means less noise and longer range on his echo sounder.

The ceramic transducers are in glass fibre housings. They come in five ranges, and are sold with a two-year guarantee.

ANCHOR LIGHT

The Bideford automatic anchor light

AN AUTOMATIC anchor light which switches itself on at dusk and off at dawn is available from Bideford Electronics, England, at a price to suit small boat owners.

It ensures that the position of a moored vessel can easily be seen by other traffic and virtually eliminates the danger of being run down at night.

Sealed

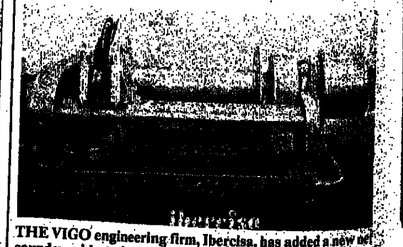
The compact unit, measuring 90mm x 45mm, incorporates a photo-electric cell and requires no day-to-day attention.

It can be powered by the boat's own supply or batteries and is available in 6, 12 or 24 volt versions, complete with a three metre lead.

The light is fully protected against incorrect polarity connection and sealed to withstand the marine environment. Fixing is done by two screws into the masthead or other suitable spar.

Known as T6/3, the light is sold in the UK for £15.38. It is made by Bideford Electronics Ltd., Kingsley Road, Bideford, Devon EX39 2LG, England.

Net sounder cable winch



THE VIGO engineering firm, Ibercisa, has added a new net sounder cable to its range of hydraulic deck machinery for fishing vessels.

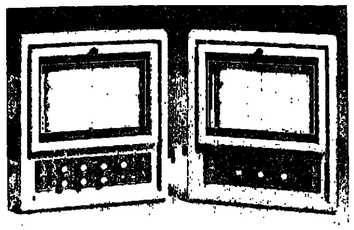
Electro-hydraulically driven, the winch is programmed to maintain constant tension. Speed is electronically measured, there are indicators for hauling or paying out the co-axial, headline transducer, cable, and there is an on-off switch to start the unit.

Ibercisa points out that not many winch firms make this type of machine. Its new Model CS-3 unit is the first from a manufacturer in Spain.

Further information from Ibercisa, P.O. Box 582, Vigo, Spain.

product news

METHODS ● GEAR ● EQUIPMENT ● PLANT ● COMPANIES



MORROW INTERNATIONAL of Salem in Oregon, USA, has introduced a new range of recording echo sounders known as the 3000 Depth Recorder series.

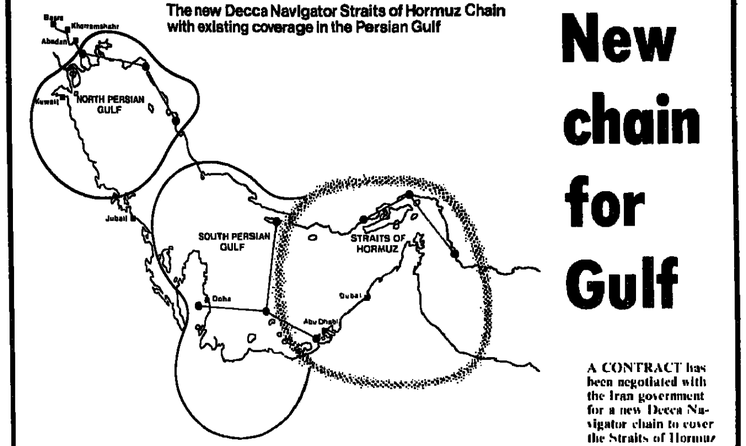
Each of the 3000 series, says Morrow, is designed to meet the needs of fishermen working in various areas under specific conditions.

Included in the series are the ST-3000 (salmon troller -- above, left), EC-3000 (east coaster troller), GTA-3000 (Gulf trawler -- above, right), and DP-3000 (deep water).

All models are in heavy-duty cast aluminium cases, coated with epoxy paint and fully gasketed. Each machine is splash-proof and corrosion resistant and has a shatterproof plexiglass window over the recording paper. It has plug-in design circuit boards and mechanical service modules.

There are 12 depth scales with 20 per cent. scale overlap, STC -- anti-gain control (variable), and two-speed paper control.

Other features include externally operated marker switch, variable illumination control, movable stylus, interference rejection, bottom line (white line) control, visual depth alarm and zero line adjustment.



New chain for Gulf

A CONTRACT has been negotiated with the Iran government for a new Decca Navigator chain to cover the Straits of Hormuz at the entrance to the Persian Gulf.

The chain will consist of a master and two slave stations. The new cover will link with that already given by the most south-easterly of the two chains already operated in the Gulf. It is expected to become operational in 1979.

Although intended mainly as a service to the heavy shipping traffic moving in and out of the Persian Gulf, the chain should be of assistance to the fishery industries being developed in this area.

SURVIVAL SUIT

A NEW survival suit is being manufactured and marketed by the Norwegian firm of Helly-Hansen A/S of Moss.

The Helly-Hansen D-600 suit meets the standards set by the Norwegian Maritime Directorate.

These stipulate that a person must be able to remain in water at 0° C., wearing only winter underwear beneath a survival suit, without the body temperature dropping more than 1° C., in one hour.

The manufacturer says that in similar conditions the suit maintains normal body temperature for nine hours.

The suit's buoyancy system consists mainly of soft synthetic, closed-cell foam built into the lining.

TOTTON PUMPS

TOTTON Electrical Sales Ltd. has added two more models to its range of magnetically-driven polypropylene pumps.

Both pumps are driven by a ceramic magnet attached to the impeller. This drive, says Totton, eliminates the need for a shaft seal.

The pumps have ceramic spindles and are driven by a totally enclosed permanent capacitor motor.

With a closed head of four metres, the model PC40 4 gives 40 litres a minute maximum flow. The PC50 7 unit gives 50 litres with a closed head of seven metres.

Selective radio calling system

IT SAVES TIME IN EMERGENCY

A SELECTIVE calling system which could save valuable time in an emergency has been developed by the Danish firm S. P. Radio A/S.

Known as the Selcall H212 system, it can be used with any VHF receiver.

Messages are transmitted from coastal stations direct to individual ships. This dispenses with the usual four-hourly traffic lists broadcast on a normal waveband. Users no longer need to listen in continually on channel 16.

"It's almost like having your own telephone," said an S. P. Radio spokesman.

Each ship has her call-code — a series of five tones. Any message transmitted from coastal stations is preceded by the code.

Once Selcall has recognised its own code, it sets off the alarm.

Linked with a dual watch facility, Selcall ensures that no messages are missed (unless someone is talking on the transmitter at the same time).

Selcall will also work without dual watch, if the set remains switched to Channel 16.

According to S. P. Radio, all coastal stations should eventually be equipped for transmitting Selcall codes, with a complete list of all ships using the system.

Retailing at £95, the Selcall system is available from S. P. Radio A/S, 9200 Aalborg SV, Denmark.

product news

METHODS ● GEAR ● EQUIPMENT ● PLANT ● COMPANIES

CONDENSING UNITS RANGE DESCRIBED

A RANGE of air-cooled condensing units from Vilter Manufacturing Corp., Wisconsin, is described in a new brochure.

Used with R-22 refrigerant, the units range from 15 to 100 ton capacity (53-352 kW). There are also larger capacity models for special industrial purposes.

All components are factory-mounted on a single structural steel base. They are completely factory-piped, wired and tested to reduce field labour and to ensure a fast start-up on site.

Units are available with a Vilter optional winter control system, recommended for cold regions where temperatures are as low as —40 deg.

Further information from Mr. M. A. Richfield, Marketing Services Manager, Vilter Manufacturing Corporation, Milwaukee, Wisconsin 53207, USA.

FOUR NEW OIL SKIMMER DESIGNS

FOUR NEW designs h… been added to Marco's r… of oil skimmers.

A larger 50 ft. (15… version of the Class … "Reversible" skimmer … permits independent rec… operation with faster respo… ing speed.

Marco has also introduc… a radio-controlled 37 … (11.2m.) Class X "Satell… model. With an 80 ton… recovery rate, it is launch… from a workboat which l… it by booms.

The 21 ft. (6.4m.) Class … "Petropack" can be ship… in packs for quick assembl… the spill site. Towed on side or both sides of the vess… outrigger style, it has a … ton/hr. recovery rate.

There is also a 122 ft. (37… Class VI "Seaguard." It… covering up to 140 tons/hr … has full crew accommoda… and can work for seve… weeks in rough seas.

Zinc anodes to protect rudders

CATHODIC protection firm M. G. Duff and Partn… Ltd., is marketing two new cast zinc anodes in its rudd… protection range.

A four-inch diameter rudder button anode, weighi… one kilo will gradually replace the present, mo… expensive, extruded 6 in. and 12 in. strip anodes. There… also a single-fixing 6 in. dia. disc anode (two kilos) offere… as an alternative to a double-fixing model.

Further information from M. G. Duff and Partn… Ltd., Birdham, Chichester, Sussex, England.

POTS STAY ON RANGE

A DEVICE called the Coburn fiddle rail enables pots to be placed and held on a boat's cooker without interfering with the cook at his work.

The range of Coburn fiddle rails covers all types and sizes of cookers. They are instantly adjustable to varying size pots. Two sizes of pots can be used at the same time on one fiddle rail setting.

Further details from Coburn Improvements, 62 Bridge Street, Banbury, Oxon, England.

BALLOON GUIDE FOR RESCUERS

A NEW distress balloon and an "Automatic" lifejacket were among the safety aids shown by the British firm Beaufort Air-Sea Equipment Ltd. at the London International Boat show.

The *Hi Buoy* is a bright orange balloon which flies 100 ft. above the victim to show his position in the water.

The balloon is carried in a small plastic case firmly attached to the wearer's belt.

Once the container hits the water, chemical reaction inflates the balloon. It is operational within three minutes.

Beaufort's Offshore Automatic M.K.1 lifejacket is designed for commercial use in cramped conditions.

Light and compact when worn on deck (pictured above, left), it incorporates a three-in-one inflation system.

On immersion it is immediately inflated by two CO_2 cylinders. If automatic inflation fails, the cylinders can be activated by pulling a ripcord. Failing that, the jacket can be blown up by mouth.

Radar tapes

The jacket includes radar-reflective tapes and an automatic light powered by a water-activated battery.

Made of orange rock-resistant nylon, the M.K.1 retails at £100.

Further information from Beaufort Air-Sea Equipment Ltd., Beaufort Road, Birkenhead, England.

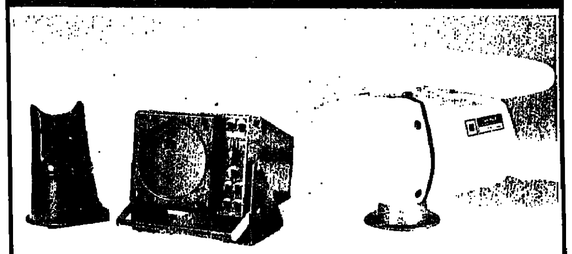
CANOPY PROTOTYPE ON SHOW

THE PROTOTYPE of a radar-reflective canopy for the Dunlop Yachtmaster liferaft was on display at the London International Boat Show.

During tests at sea, Dunlop says the raft has been picked up on radar screens seven miles away in calm seas and at least two miles in rough conditions.

Introduced in 1976, Dunlop's Yachtmasters are made in four sizes for two to eight men. They include a wedge-shaped arch designed to give maximum headroom.

Radar for India



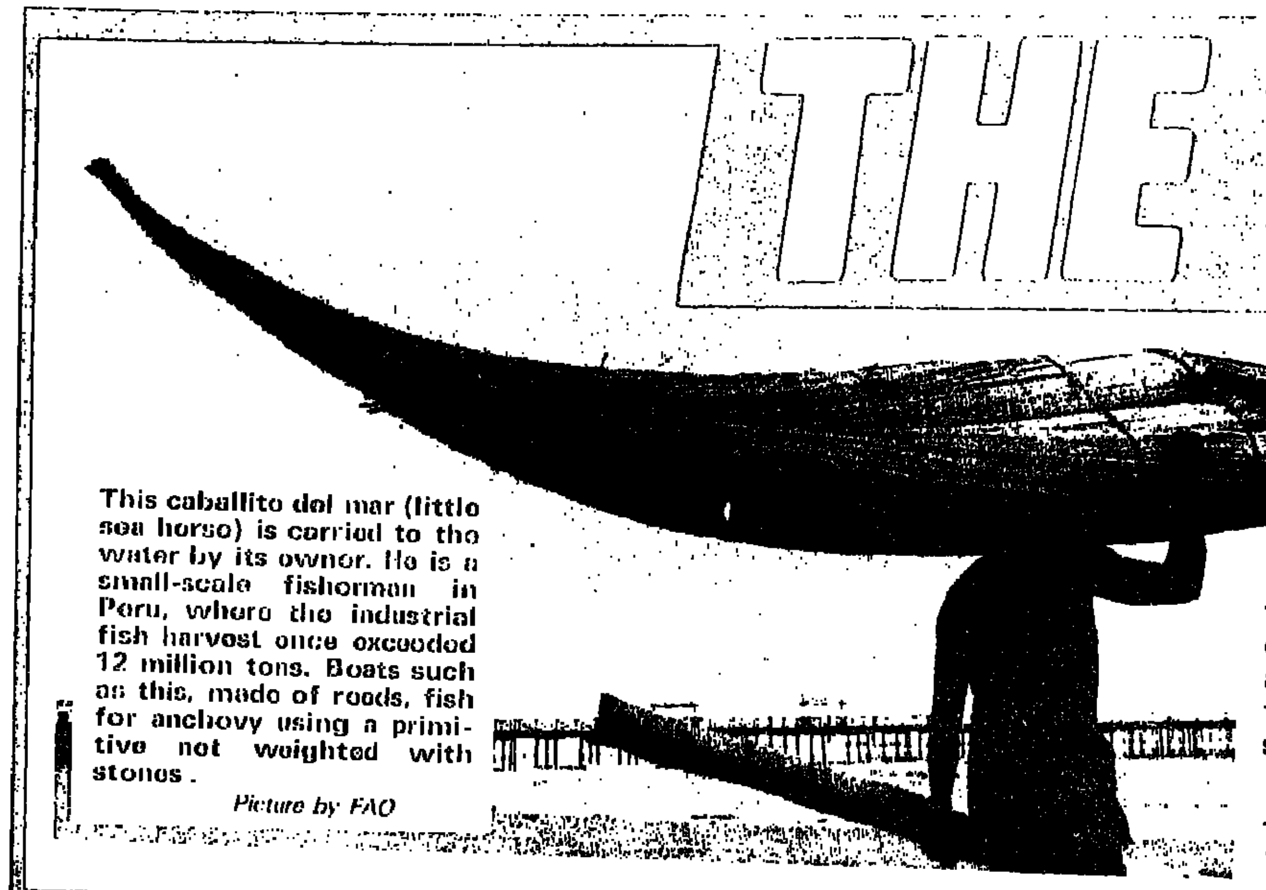
UK firm wins Goa trawler order

TEN SEAVEYOR marine radars have been ordered by Chowgule & Co. Private Ltd., of Goa, India. They are being installed in trawlers building at its Mormugao yard.

With an 8.5 in. display, the sets have a range of 36 nautical miles, low power consumption of 96 watts, and an aerial rotation of 30 rpm.

The order was placed with British manufacturer, Electronic Laboratories Ltd., Poole, Dorset, by the company's Indian agent, F. W. Stevens & Co. Private Ltd.

THE MINI FISHERMEN!



This caballito del mar (little sea horse) is carried to the water by its owner. He is a small-scale fisherman in Peru, where the industrial fish harvest once exceeded 12 million tons. Boats such as this, made of reeds, fish for anchovy using a primitive net weighted with stones.

Picture by FAO

In the years since his retirement as head of fishing gear research in West Germany, Dr. ANDRES VON BRANDT has been making a special study of the smallest fisheries, their often traditional methods, and how these might be employed for the benefit of fishery industries around the world. He discusses these mini-fisheries in this, the first of two articles specially written for *FNI*.

One of the greatest living authorities on this subject, Dr. von Brandt is the author of "Fish Catching Methods of the World."

FOR MANY YEARS the catching performances of nearly 200 countries and territories have been recorded in FAO's Yearbooks of Fishery Statistics. These list the harvest of aquatic animals and plants in the sea and in freshwater. The yields of the very small subsistence fisheries are in there, along with those of the industrialised and the larger inshore fisheries.

But how accurate the figures for the subsistence fisheries may be is open to question. They are widely dispersed, and, while industrialised fisheries and also many small vessels channel their landings through ports and markets, this is not the case with the subsistence fishermen.

Yet their contribution is becoming more and more important. They do, for example, provide employment for a large number of people. In the developing countries of Africa, South America and Asia, the social significance of providing a living, and a way of life, often far outweighs the advantages of more efficient, mechanised fish production — a lesson which industrialised countries may yet have to learn.

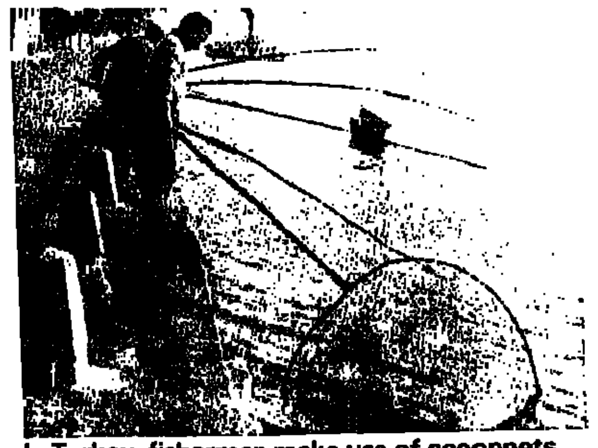
In development plans

It is for this reason that these more flexible small-scale fisheries are taking an important place in the development plans of many countries, and also in the eyes of international bodies such as FAO.

Despite their newly-acquired importance, the subsistence fisheries still do not provide us with sufficient catch data. We also lack reliable estimates of what constitutes a "personal use" catch for a man, family or group. Spectacular catches are seldom reported other than during spawning or migration, so that subsistence catch statistics have been neglected or underrated.

Here in Japan, the world's largest and most advanced fishing nation, a boy uses a small agricultural basket for scooping molluscs, insects and small fishes.

Subsistence fisheries are very important to many people...



In Turkey, fishermen make use of scoopnets and the strong current of the Bosphorus to catch small fish.

Given suitable natural conditions, we can expect to find subsistence fisheries where living standards are depressed by poor agriculture and a lack of other crafts or industries. It may also be because of social or geographical isolation, or when the inadequacy of the resource and/or marketing possibilities simply prevents commercial development.

Such mini-fisheries may, however, be vital to the well-being or even the survival of the people involved in them. They therefore have their place in international catch records, and in the fishery politics of their countries.

There are many shades of definition covering the term "subsistence fishing", from gathering edible or usable material on the foreshore to the use of simple fishing equipment.

Simple gathering

They can be grouped as follows: 1. Collecting from the beach, when the only equipment used is a bag or basket. 2. Shallow water fishing by wading or even plunging, perhaps using a manual aid. 3. Diving singly or in groups, perhaps with an instrument to extend the reach of a man to slightly deeper water. Also collective fishing, using a single gear. 4. The use of rafts or floating pots, barrels, etc. to transport man, catch or gear.

All four groups represent simple gathering of small quantities for daily consumption but each is distinguished by an increasing level of technical effort.

The aim of subsistence fishing is to obtain food for men or animals and need not be confined to any species or even genus; it can be plants, fish, crustaceans, water mammals or even birds. In fact, the fish component may be a minor one, so that one could sometimes question the term "fishery." Often such mixed fisheries have left their mark on gastronomic history by equally mixed dishes such as the French *bouillabaise* and Italian *frutti di mare.*

Mostly, the prey of the subsistence fisherman is static and easily gathered and, if capable of locomotion, then it would have to be slow or rendered easy to catch by spawning, stranding or migration. In such circumstances, large catches may be made of a single species, using simple methods; or big mammals such as whales can be scared ashore and stranded, again without the use of fishing gear.

Also, large quantities of water plants can be gathered without the use of special gear; this may be algae for human consumption or other plants for medicinal use, for fertilisers or for processing into alginates, iodine and other substances.

To deeper water

To extend the effectiveness of a subsistence fishery, it may be necessary to move into deeper water and to capture the more mobile varieties of prey. Simple hand tools are no longer enough. When fish poisoning is unknown or impractical, specific gears must be developed and tactics evolved according to the behaviour characteristics of the prey.

Thus we move from spears, hooks and simple traps to the modern concept of fishing gear. Before the general adoption of the fishing net this would comprise barriers, filters and traps made of wood or basket-like material by which fish were trapped, lifted clear of the water or caught with a cover pot.

The introduction of fishing nets made possible types and varieties of gear and method hitherto impossible, from drive-in nets, gill nets, tangle nets and trammels to seine nets and trawls, though we have yet to see the mechanised harvesting machines and computerised fishing systems which I forecast in 1975.

Meanwhile, the subsistence fishery provides us with a living record of those primitive methods which were once universally practised and which were the starting point for gear development.

We can enlarge on our earlier grouping of subsistence fishing methods by following the lines of my classification (1972) as follows: 1. Gathering by hand or with simple tools, bags or baskets, maybe after concentrating the prey by the use of light, by draining a pond, damming a stream, frightening fish on to a beach or simply digging the catch out of the mud. Tools seldom used. 2. Tools used to extend the reach of the human hand. These may catch fish by grappling, grasping, or piercing, and sometimes by means of spears, arrows, harpoons or other projectiles. Tongs or rakes may be used, primarily for shellfish. 3. Stupifying fish by means of poison — the ancient precursor of electric fishing — used both in the tropics and by North American Indians. Less effective is the use of stones and clubs to stun fish. 4. Fishing with hook and line. Hand lines, setlines and trolling can be considered as of low technical effort and in this context, do not include the use of modern barbed hooks. Unbarbed hooks are also used to foul-hook the prey and in conjunction with jigs and gaffs. Line fishing can be practised in tidal waters by laying ground lines or in deeper water from floating objects such as rafts. Line fishing by sport fishermen could also be classed as "personal use" fishing.

Next month we shall consider the people engaged in subsistence fishing, and its possibilities for development . . .

A Filipino subsistence fisherman patiently waits to shoot a fish with a home-made rubber-band harpoon.

Chinese woman on Taiwan catch snails and other aquatic creatures in a shallow pond using dragged scoopnets.

The books page

Gear study revised

TEN YEARS after it was first published, gear technologist John Garner's brief but very well illustrated introduction to trawling equipment has gone into a second edition.

The 80 pages of *Modern Deep Sea Trawling'* starts with a chapter on the empirical development of trawl gear.

This is illustrated by two drawings which help to clarify the progress of gear design from the beam trawl to the appearance of the otter trawl in the 1880s and on through the Vigneron Dahl trawl in the 1920s to the enlarged Granton.

Garner notes that the perfecting of mid-water trawling from factory ships is a major modern development, and he considers this in a special chapter.

'Fishing News Books, Farnham, England. Price £6.25 plus postage.

SOUTHERN AFRICA'S FISH STOCKS...

Revealing and provocative study of a lesser known region

DESPITE its growing importance over the past 30 years, the south-east Atlantic is one of the lesser known of the world's great fish producing regions. It has not, for example, been researched to nearly the same extent as the long-worked regions of the North Atlantic or even relatively newer regions such as those in the North Pacific.

One reason for this is that the resource research effort of the main littoral country, South Africa, has never really matched the value of fisheries to the country. Another is that the region has attracted a mixed bag of distant water operators and, until recently, few seemed inclined to share their findings with each other or the coastal states.

South Africa continues to lag in basic research, but the lack is more in the tools needed and in size of establishment than in the quality of the people engaged.

It may surprise readers to learn that this large fishing nation, with a catch always well over 1.2 million tons a year, is ekeing out a research fleet flagship built in 1950.

Ships of this type and vintage built for Britain, West Germany, Norway and several other countries shortly after World War II were replaced as obsolete five to six years ago. The South Africans are still trying to make up their minds what new ship to order and when.

But research has gained from the co-operation among countries fishing the region who are participating in the ICSEAF, the international commission which FAO helped to create in the early 1970s. And FAO itself has now published a comprehensive and provocative study of the living marine resources of the region.

New generation

This has been prepared by Dr. Garth Newman, one of the brightest of a new generation of South African marine scientists. He reviews the nature, distribution and state of exploitation of fishery resources in an area extending from Zaire round to Mozambique.

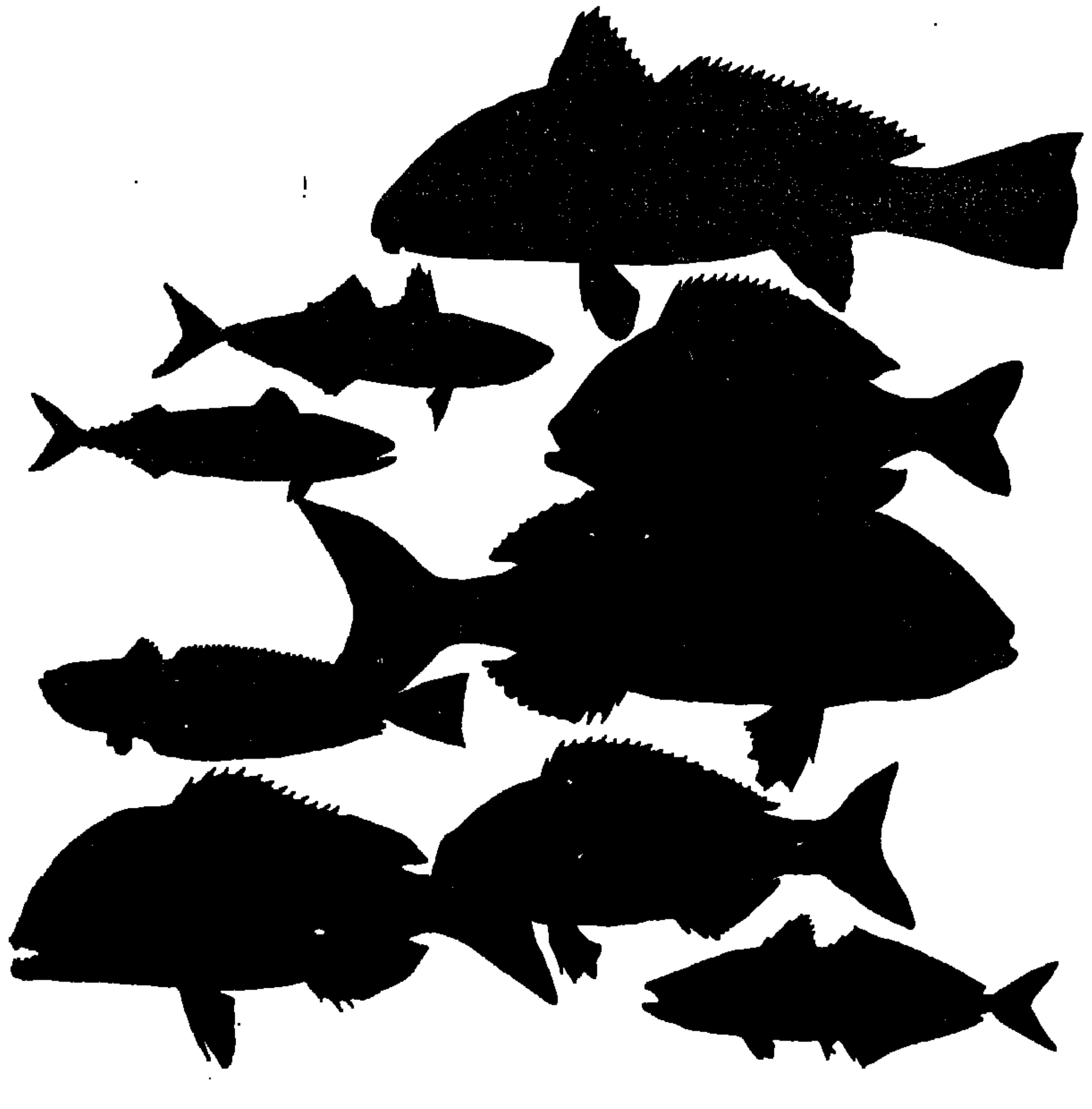
With the total catch for this region amounting in 19[illegible] to just under three-million tons, most stocks appear to be intensively exploited. Dr. Newman recognises a number of problems in management including the high variability in recruitment in some coastal stocks such as horse mackerel.

Two directions

He considers that the main thrust of future research should be in two directions. The first should be to improve the quality of information required to manage presently exploited stocks; and the second to establish the real potential of what may be very large resources in the region of underused species such as cephalopods and myctophids.

South African purse seiners have actually caught over 40,000 tons of myctophids (lantern fish) in a year. But successful harvesting on a large scale may need special mid-water trawling gear and good information on availability and distribution.

Dr. Newman's report (Fisheries Technical Paper No. 178) is part of FAO's updating of world fish resource assessments published in 1971 as *Fish Resources of the Ocean*.



Ocean resources — no real damage yet

IN THE FIFTH volume of the Environment and Man series, the *Marine Environment** the key chapter on Marine Production is written by Dr. Paul Tett of the Scottish Marine Biological Laboratory at Oban.

The sea, as the editors of the series point out, "is a vast environmental laboratory from which we have much to learn."

It is, despite the growing danger of pollution, and repeated warnings about overfishing, a potential source of great wealth which has not yet been damaged significantly by the carelessness, greed or stupidity of man.

According to Dr. Tett, global production of fish suitable for human food is about 100 million tons a year. More than half of this is already being harvested.

While aquaculture offers attractive possibilities in developing countries, Dr. Tett is more cautious about what might be accomplished in western developed countries.

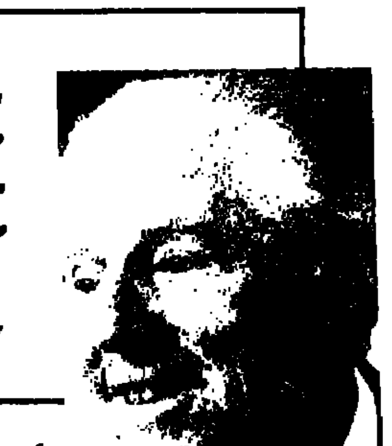
It may, he says, be limited to the production of small amounts of luxury fish "unless there is a significant change in economic conditions."

Among the other subjects of fishery interest in this volume are chapters on inorganic wastes and the biological consequences of oil spills.

* Published by Blackie & Son Ltd. Price £8.90 hard cover and £4.50 soft cover.

walkabout talkabout

with Arthur J Heighway



IN THE January issue I told how Cedric Day's press releases of FAO's discovery of the extent of the shrimp resource on the West Coast of India led to a great surge of development — this after the report had lain inert for some time in official hands.

In acknowledging my account Cedric writes: "It is remarkable how a few hundred words of press publicity sparked off a development that has earned India much more than 100 million dollars. That was in 1973 and it is still going on although there is danger of killing it by over fishing as I saw in my recent visit to India."

It is worthwhile driving this story home for it does illustrate the service that print in both periodical and book form does render to fishing. It spreads the news and the wise fisherman is he who uses print and the information therein to advance his own activity.

I recall that Sir Fred Parkes once told me that a material factor in the building of his career and fortune in trawling was his practice of thoroughly reading even the small advertisements in *Fishing News*. It was such an advertisement which led him to build a lucrative trade to France in cod eggs, then almost a drug on the English market.

Torry conference

Torry Research Station is to celebrate its 50th anniversary of establishment by staging in July 1979 an international conference of fish science and technology. This will extend over four days and review the state of advancement in various areas. An official brochure giving details will be available to prospective participants towards the end of this year.

That news started a train of thought covering man's association with fish since his primitive days. Rudolf Kreuzer, formerly with FAO and now retired but still actively interested in the history and evolution of fish products, contributed a lengthy and fascinating article on that aspect to the volume *Fishery Products* which resulted from the FAO Conference in Tokyo 1973.

He researched the subject very thoroughly and brightened his article with a rather fabulous collection of illustrations from ancient times including rock drawings from ancient caves in Norway, Spain and other places showing primitive man's early link with fish.

Some of those drawings are carbon-dated back 11,000 years. (Incidentally I am always intrigued as to how the scientists' sums generally come out at even round numbers — and never for example at 10,897 or 11,341. So we just have to accept the approximation, for no meticulous-minded accountant is likely to quibble now).

But passing on from that era, Rudolf, whose last postcard to me, posted at Panama, recorded his departure for Pacific Island wanderings still searching for fishy information, did on another occasion give me evidence of the Sumerian devotion to fish.

Pay in barley

An archeological find of many years' hoardings of clay tablet recordings of fishermen's catches around the Persian Gulf area of 4,000 years back enabled him to work out that a fisherman's wage for a month was some 30 measures of barley!

This was before the creation of money when a community headed by priests supervised the local agriculturists and fishermen. The scribes recorded the details on clay tablets, subsequently sun-dried and filed.

Sun-drying was also the first method of preserving fish for subsequent use — supplemented later by smoking and then by the application of salt. For century after century that technique sufficed to maintain humanity on the basis of subsistence feeding.

Only in the last little more than one hundred years has need for developing the marketability of fish arisen through the growing concentration of population in large towns and cities. And what a tremendous story it is.

Fishermen and skippers have to be adept at meeting emergencies. The same applies to editors.

I told this story when I was challenged recently to produce an anecdote:

In Australia's early pioneering days, when times were hard and bushrangers active in hold-ups and robberies, one such criminal was caught in an isolated wayback bush town.

He was tried and sentenced and the hanging was fixed for Wednesday noon — which was the time of publication of the local weekly.

Determined to be up-to-date with the news, the editor felt constrained to write the story in advance, which he did with verve and vigour, outlining the crimes and painting the horrific final scene with the corpse swinging in a drying wind from the sun-baked desert and a wandering crow already perched on its head.

Satisfied with his work, the editor, two hours before deadline, adjourned to the local "pub."

In rushed the printer, "Hey boss, the story's busted: a reprieve has come."

The editor completed his drink. "Bring me a page proof" he said. He surveyed this with calm deliberation then instructed "Take out the top heading; insert in biggest type 'What Jones Missed.' Run the issue and you'll catch the bullock waggons for out back."

First, blocks of ice brought by the shipload from northern areas; then the coming of refrigeration; then came canning, and next processing of fine cut fish into fish fingers skilfully packaged — and since then endless variation as outlined in the contributions of hundreds of scientists and processors in that book *Fishery Products* based on the Tokyo meeting.

And now Torry's Jubilee will survey recent advances since the Tokyo period. It will be an impressive occasion in tribute to the ingenuity of modern man in meeting food needs; and adapting fish both for subsistence and luxury eating.

Inflation and the disruption in traditional supplies caused by new controls and fishing limits have occasioned dramatic changes in price levels. Detailed surveys of world prices for fish show that in Japan the price of fine finfish has jumped by up to 200 per cent in the past year and in the USA many seafood specialities have practically priced themselves out of the market.

This trend is forcing more and more research for cheaper supplies of hitherto relatively unexploited species such as squid now being seriously investigated by Australia. And of course krill. But at present I leave that to the scientists and the future. In any case, the whales use it better.

Last year, two little fishing vessels each under 70 feet in length landed at Grimsby catches grossing £690,157 while one big trawler of about 200 feet in length landed catches worth £739,732. The two boats worked together in the pair trawling system which under various specialised techniques to suit particular fisheries is now making a remarkable impact on world fisheries.

The merits of that general two-pair system are fully outlined in a new book *Pair Trawling and Pair Seining* from Fishing News Books Ltd., Farnham. The author is David Thomson.

It has been painstakingly compiled and authoritatively written and is at once historically valuable, technically reliable and statistically informative and up to date. For instance, it gives the detailed story of these two little craft from Grimsby and the astonishing development over recent years of the two-boat system not only in the North Sea but in many other fisheries around the world.

Danish teams

These are the essential facts. Two Danish families, Bojen and Borum, were the Grimsby initiators. By working together they landed in 1972 in a five-day trip a catch worth £12,000. In 1975 pair teams on several trips averaged over £2,000 a day

By the end of 1976, with inflation prices ruling, one Bojen team's catch grossed over £40,000 for 13 days at sea. That is a daily average of £3,000 up, compared with £1,750 per day made by the best of big trawlers — three times the length of the small vessels, fifteen times the power and probably five times the capital cost of a pair.

David Thomson comes from a long line of Scottish fishermen and is himself a qualified skipper. To that background he has added academic training and is now engaged in the Far East on FAO projects. He earlier wrote *The Seine Net* — the authoritative work on that technique.

His *Pair Trawling and Pair Seining* covers every advanced application in specialised fisheries — pareja trawling as developed by Spanish fishermen, "Bull" trawling evolved by the Japanese, Baltic and cod pair trawling, Canadian pair seining, freshwater and midwater pair trawling, ring net fishing and two boat purse seining and finally the modern technique of fleet operations.

Ample illustrations (149 in the book) give details of boat design and layout, the nets used and supplementary equipment. In detail the book is painstakingly complete with glossary, conversion tables and bibliography as well as operating details and practices — in essence a well designed and thoroughly competent work for which the author deserves the highest praise.

As a gesture to his early life and training and in recognition of the service given to fishermen, all royalties from sales of the book are directed straight to the funds of the Royal National Lifeboat Institution.

Technology papers — a new list

THE Fish Production and Marketing Service of FAO has compiled a new list of Selected Publications on the Technology of Fish Utilisation and Marketing.

The last time this was done was in 1971 when the list concentrated only on technology.

Most of the documents listed are books or reports. Sections heads include hygiene and quality control, species identification, analytical methods and sampling procedures, handling and processing, nutrition, and marketing.

Fascinating story of the great basking shark

The books page

OCEANS OF TECHNOLOGY

MARINE explorer Jacques-Yves Cousteau's view that the sea has become the sewer of the planet "through ignorance and incomprehension" is one of the issues discussed in *Technology Assessment and the Oceans.

Edited by Philip D. Wilmot and Aart Slingerland, the book carries over 40 papers given at an International Conference on Technology Assessment held two years ago in Monaco.

Subjects include food from the sea, minerals, oil and gas, pollution, and coastal zone management. There are also sections on practical and analytical aspects of technology assessment.

Published by IPC Science and Technology Press. Price £12.

DR. F. C. STOTT, who is a world authority on the basking shark, comments as follows on our review of Kenneth McNally's book, *The Sunfish Hunt* (*FNI*, November 1977):

After reading this review and then the book itself, I think it is unfortunate that the better known name of basking shark was not used in the title.

The book certainly tells a fascinating story of the basking shark fishery in the west of Ireland.

Confusion

Unfortunately, we still do not know with certainty the basic facts of the biology of this, the second largest fish in the world — its migrations, its breeding, its growth rate and normal life span. As a result, we get the confusion over the reasons for the decline of the fishery in such places as Achill Island.

Through the good offices of Mr. W. J. Sweeney, I had the privilege of collecting some scientific data at his Achill Island Fishery between 1960 and 1967.

In co-operation with the late Dr. H. W. Parker of the British Museum of Natural History, some results were published in 1965.

Briefly these were that it was probable that migrations took place from offshore to inshore of local basking shark communities in spring and the reverse in the autumn; that sharks were viviparous and produced five or six young at birth after a gestation period of about 1.1 years; that growth from 1.5 metres to about nine metres took around 14 years.

Calcification of the cartilageneous backbone took place also in a regular way and tentatively this was used as a method of ageing fish by counting the number of "rings" in a section of the backbone.

From a commercial standpoint, one fundamental question to be answered is: what is the main cause of the decline of the Achill Island Basking Shark Fishery.

Mr. K. McNally suggests over-fishing, and that would seem to be the most likely answer with our present state of knowledge.

Norwegians

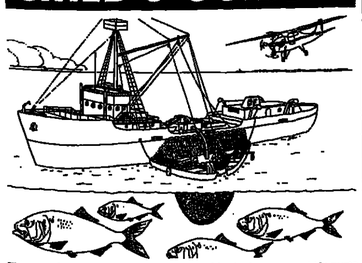
However I would not agree with Mr. McNally that overfishing is so easily attributable to the Norwegian shark fishermen. From the figures he gives in his book, it is seen that between 1950 and 1956 some 9,250 sharks were taken by the Achill fishery — an average of 1322 a season.

After this, a steep decline set in as if a local slow-breeding community of fish had been decimated through seven years of overfishing.

While it is true that the Norwegians do make odd sorties outside their own coastal zone to Orkney, Hebrides and South-west Ireland, I have noted from examining their basking shark records that the fishery fluctuates between about 1,000 and 3,000 sharks. Most of these are taken off their extensive coastline.

The fishery is controlled by a sales organisation which fixes the price of liver oil at the start of the season according to demand and this determines in general the number of sharks taken. Quotas are sometimes also fixed for each shark boat.

CHILD'S GUIDE



This page from the colouring book says: "Menhaden are caught in purse seines and used for fish meal and oil."

A NOVEL new way of interesting young children in fish, fisheries and marine science has been introduced by the Sea Grant programme at a United States east coast university.

This takes the form of a colouring book for junior school children with its pictures accurately drawn from a scientific perspective, and put into a carefully designed layout.

Titled *Discover the Atlantic Ocean*, the book depicts some 80 species of fish and shellfish in its 38 large pages. Each fish is briefly described and the indexes give the common and scientific names of each species.

The publishers are the Virginia Polytechnic Institute and State University. The illustrator, Ron Clayton, has a master's degree in fisheries. The text was written by George J. Flick, who heads the University's Sea Grant programme.

This colouring book is one of many projects that the VPI programme has completed or is currently undertaking. They are all intended to provide better and more comprehensive education, at all levels, on the protein resources of the sea and their importance to man.

Projects include development of textbooks, tapes, films and other learning aids for high school and college levels.

Further information about the book *Discover the Atlantic Ocean* and the projects can be obtained from the Sea Grant, Extension Division, VPI & SU, Blacksburg, Virginia, 24061, USA.

NORWAY GEAR SHOW

THE EXPORT Council of Norway is repeating its successful small exhibition of ship's gear, which it introduced in London last year. The showing this year will be in the Bloomsbury Centre, London WC2, from Tuesday, April 18 to Friday April 21.

Meetings and exhibitions

Librarians meet in Liverpool

THE MARINE Librarians' Association met in Liverpool in January for its seventh annual conference. There were 40 delegates at the three days of lectures and discussions.

Formed in January, 1972, the Association meets once a year for the conference, and organises branch lectures and visits. Members are drawn from colleges and universities, shipping companies, laboratories and government departments.

The Association now has more than 100 members, 20 of them marine librarians outside Britain.

There are no formal qualifications for membership, which costs £1, "except an interest in the provision of literature in the marine field."

Further information can be obtained from the Secretary, Alston Kennerly, who is Senior Information Officer, Plymouth Polytechnic, Drake Circus, Plymouth, England.

TORRY JUBILEE GATHERING

BRITAIN'S Torry Research Station was founded in Aberdeen in 1929. Next year, therefore, it commemorates its 50th anniversary, and to mark the event it is holding an International Conference on Fish Science and Technology. This will be in Aberdeen from July 23 to July 27, 1979.

The aims of the conference are twofold. First it will review the state of advancement in various areas of fish science and technology. Second, it will provide a forum for the presentation of the latest findings in research and development.

For the review, Torry is planning to have 15 plenary lectures by leading authorities.

There will be two general lectures on the theme "Response to change." Four lectures on fish technology topics will cover handling methods, preservation, utilisation and new products, and quality improvement and maintenance.

Fish science

Then there will be nine lectures on fish science. They will cover quality assessment, proteins and structure, lipids, other organic components, nutrition, biological factors, microbiology, physical properties and processes, and engineering.

The formal lectures will combine a history of developments over the past 50 years with appraisals of the present position and of probable future trends.

Second aim

Torry is to achieve its second aim by inviting scientists and technologists to read and discuss accounts of original work. Time will be available to present about 100 papers, "which will be selected on the basis of interest and topicality."

All the lecture and papers will be published.

The conference will last four days in two equal halves separated by one day devoted to visits. On this middle day Torry Research Station will be open to visitors. Conference tours will be arranged to places of interest.

Towards the end of 1978 a brochure giving fuller details and an application form will be available from Torry Research Station, P.O. Box 31, 135 Abbey Road, Aberdeen AB9 8DG, Scotland.

RSW tanks for shrimp?

REFRIGERATED seawater (RSW) for the preservation of pink shrimp *(Pandalus borealis)* at sea was the subject discussed at a meeting in the laboratory of Oregon Seafoods, Astoria, USA.

Pacific Ocean shrimps of this and related species are an important food catch in north-west United States, and of Alaska in particular. In 1976 the total catch was just under 75,000 tons.

Among the researchers present were university workers and representatives of the National Marine Fisheries Service laboratories in the region.

Although a number of American shrimp boat owners are planning to introduce RSW systems into their boats, processors still show mixed feelings about receiving shrimp held in RSW.

The consensus of the meeting was that RSW can be applied to the preservation of pink shrimp. But success will depend on careful attention to sanitation, temperature, and circulation. And also on ensuring that the catch is landed within a reasonable time of being brought aboard.

FISHERIES' COUNCIL VENUE

THE 33rd annual meeting of the Fisheries Council of Canada is to be held in Quebec City from April 30, to May 3.

As for previous meetings of this substantial organisation, a full programme of papers, presentations and discussions is being prepared. The general sessions will provide a wide-ranging review of the Canadian industry and its relations with industries and markets outside.

A special feature of the 1978 meeting will be the availability of simultaneous translation services in French and English.

Further information about the meeting can be obtained from the Fisheries Council of Canada, 77 Metcalfe Street, Ottawa, Canada K1P 5L6.

Fish taken on Europe tour

THE CANADIAN Government is staging a fisheries promotion in six European cities from March 6 to March 17.

Thirty companies from the Atlantic and Pacific coasts, and from some inland areas, are displaying their products for tasting.

This display is being preceded by a meeting where officials from Federal and Provincial Fisheries Departments will speak on the prospects for the Canadian industry. They will deal in particular with the expected effects of the 200-mile limit and projected landings up to 1985.

A representative of Air Canada will discuss air freight services available from Canada to Western Europe.

Workshops

The general meeting is followed by four concurrent workshops — on groundfish, salmon, shellfish and herrings. In each of them the discussion will be led by a specialist from the Canadian industry.

In the salmon section, firms from British Columbia are making a presentation of eight species — sockeye, coho, troll red spring, white spring, pink, silverbright, chum and qualla (described as a dark-coloured chum with white flesh).

Home economists from the Department of Fisheries in Ottawa will supervise the presentation of the fish dishes. These dishes are being offered for tasting at display table manned by representatives of the Canadian companies.

Taking part are some of the largest fish producers in Canada, including the Freshwater Fish Marketing Corporation, National Sea Products, and H. B. Nickerson & Sons.

The presentation starts in London on March 6 and then moves on to Paris on March 8, Antwerp March 10, Hamburg March 13, Frankfurt March 15 and Zurich March 17.

E. Indian Ocean survey

AUSTRALIA has been invited to take part in talks in Indonesia about an FAO/United Nations Development Project survey of fishery resources in the east Indian Ocean south from Java to Albany in Western Australia.

Australia has undertaken to co-operate in the project and has already examined information available on resources in the area.

It is hoped that a chartered Government exploratory fishing vessel, the *Courageous*, may work in the area in 1978.

MATERIALS FOR DEVELOPING COUNTRIES...

BANGKOK, THAILAND, will be the venue of an international conference, from August 22 to 24 on Materials of Construction for Developing Countries.

Sponsored by the Canadian International Development Agency (CIDA), it is being organised by the Asian Institute of Technology in association with the University of New South Wales.

The conference is intended to provide a forum for engineers, contractors and designers involved with construction materials. It will review problems associated with the proper use of such materials. And it will encourage further research in developing new materials, "particularly those which are indigenous to the region."

One subject which could be of particular interest to fishery industries is the applications of ferro-cement to boatbuilding.

Further information about the conference can be obtained from Dr. Ricardo P. Pama, Asian Institute of Technology, P.O. Box 2754, Bangkok, Thailand.

WIDE INTEREST IN SEAFOOD CONFERENCE

INTEREST in the International Seafood Conference to be held in Monte Carlo from November 12, to November 15, has been described as "overwhelmingly favourable," by the sponsoring organisation.

According to Robert Erkins, publisher of the Erkins Seafood Letter, more than 150 companies from 19 countries have indicated that they will be represented when the "first international meeting of the seafood industry convenes."

Among matters of interest to be discussed will be why multi-national companies are entering the seafood business and the effects of extended jurisdiction.

Participants will also consider supply prospects and forecasts, fisheries development plans of the emerging nations, and technological breakthroughs.

Special post-conference tours to the International Food Products Exhibition (SIAL) in Paris are being arranged. Conference participants who attend SIAL will be entertained in Paris by the state-sponsored organisation for French food and wine promotion

Every month *FNI* circulates in some 160 countries and territories. Many of these are the familiar fishing giants, such as Japan, the USSR or Norway. But many others have fishery activities that are little known. They may be small and remote; they may be undeveloped but full of promise for the future. With the help of our correspondents, of FAO and of the bilateral agencies, we shall be looking at these fisheries. We start with a two-part report by our FAO correspondent CEDRIC DAY who has just visited the People's Democratic Republic of Yemen.

Taken some years ago, 25 miles south of Aden, this picture shows South Yemeni fishermen longlining for yellowfin tuna. The fish on this haul averaged between 12 and 16 kilos. Tuna are among the resources known to abound in the rich waters off the PDR of Yemen.

where the richest resource is fish

IN THE People's Democratic Republic of Yemen, about 12 per cent of the national budget is devoted to fisheries. This makes sense because marine fish and shellfish in the 700 miles of coastal waters in South Yemen are the country's richest natural resource.

On a recent visit to Aden, I was told that investment in fisheries had increased from 256,100 Yemen dinars in 1972 to more than nine million dinars (about £5.4 million) in 1977.

This increase has been accompanied by an equally remarkable rise in the export trade of the fisheries. From 1,349 tons worth US$1.9 m. in 1972, it jumped to 7,878 tons and $12.46 m. in 1976. The 1977 figure topped this in only nine months.

The PDR of Yemen became independent in 1967. The Fisheries Department was established in 1948 under British rule but it is only over the past ten years that there has been a concerted effort to exploit the fish resource. As a small country (its population is about 1.5 million), the PDR of Yemen has needed assistance. This has come mainly from oil-rich neighbours, from international agencies such as FAO, from international banks, and from bilateral agencies. The main effort, however, has been that of the South Yemenis themselves.

Focus on a developing fishery

Exploratory fishing, especially that in collaboration with the government by FAO's Indian Ocean Programme, provided the basis for planning fisheries development, I was told by officials of the Public Corporation for Fish Wealth.

Preliminary estimates indicated that the South Yemeni fishery resources could provide a sustainable yield of more than 350,000 tons a year.

The step from surveying stocks to catching them can be forbidding. For example, the government bought a purse seiner with money from the Arab fund but, despite the presence of a Norwegian skipper, the boat made poor catches, never more than five tons, where surveys indicated good stocks.

Better results

Another Norwegian skipper, renowned in purse seining, was brought in and at once started to catch more than 100 tons of sardines in trips of a few hours. Since then, after training by this successful skipper, others have consistently made big catches.

As Mr. Abo Wahab Sharaf and other executives explained, the Public Corporation for Fish Wealth is the body responsible for the control and development of South Yemen's fisheries. It has departments for planning and statistics, fishing, lobster fishing, coastal boats, research, training, dried fish and curing, export and domestic marketing, and accounting and administration.

The first years, 1968 to 1971, were chiefly spent in collecting data and establishing a research and training institute, aided by the USSR. A three-year plan was put into operation 1971-74, leading to the current five-year plan (1974-79).

Co-operatives

In order to break the traditional middleman-fisherman pattern, the government set up a co-operative system. So far, some 14 co-operatives have been established. More than a quarter of the country's fishermen are members of them while a much larger number are "landing members." These are fishermen who make use of the co-operative facilities without becoming full members.

The co-operatives are run by committees of fishermen elected each year by the members.

All fish are bought by the Public Corporation for Fish Wealth at fixed prices whether caught by co-op members or others. The co-ops sell their members' fish to the Corporation, charging ten per cent. of the value of the sale. Of this, three per cent. is for social security and seven per cent. for provision of boats (sail or row boats). A further 15 per cent. is charged for mechanised vessels. Co-operatives are responsible for providing gear and equipment and for keeping boats and engines in good repair.

Off to Shuqra

To see how a co-operative works, I went to Shuqra where one has been operating since 1970. The manager said all the local fishermen — 395 — had joined, but membership has declined to less than 200 because 120 men have gone to work on the Corporation's trawlers and seiners or elsewhere, and others have retired. But, since an increase had been made in the prices for fish, more men were taking up fishing and membership of the co-op is rising again.

Fishermen are now getting about twice as much as they did under the traditional system — about 30 dinars a week instead of 10 to 15 (a Yemeni dinar equals about £0.60). The skipper of a boat gets 45 dinars instead of 30.

I spoke to a number of the local fishermen who confirmed these figures. Their improving condition is reflected in the mechanisation of boats — of 98 vessels owned by the Shuqra co-op, only 15 are sail boats, all the others being powered, most of them with outboards.

As evidence that the fishermen's committee do not

Turn to page 60

BANGLADESH- 'unofficial' view of the men on the spot

SOME UNUSUAL but very practical reports on fisheries in Sri Lanka, India, Bangladesh and Pakistan have been prepared by the staff of the FAO/UNDP project for the Development of Small-scale Fisheries in South-west Asia.

They are really working papers and not official reports, writes *FNI* correspondent Cedric Day. Their special value is that they are the result of personal, on-the-spot studies carried out in co-operation with the fishery authorities.

The reports are in two sections. The first describes the small-scale fisheries in the country; the second assesses their problems and needs.

Among the first reports I saw were those dealing with Bangladesh where the population — already more than 79 million and growing rapidly — is one of the world's worst nourished. The calorie intake is only 54 per cent. of requirement and protein only 40 grams a day.

Fish is the major source of animal protein making up about 80 per cent. of total intake. The urgent need therefore is to develop the fishery resources.

In its general description, the 32-page report considers the fisheries administration, companies and co-operatives together with fish resources, production, boats and gear. Also included are landing places, handling and processing and distribution.

The second part sums up what is needed to develop the country's small-scale fisheries. It considers physical requirements such as twine and nets, engines, markets and fish carrier services.

Other recommendations deal with the provision of community development services, and with demonstration and training projects in fishing villages.

Minister brings in new measures to aid small-scale fishermen and stop corruption

Sri Lanka shake-up!

NALIN WIJESEKERA in Colombo

FAR-REACHING amendments to the Fisheries Ordinance are being introduced in the Sri Lanka Parliament by the Minister of Fisheries, Mr. Festus Perera. These are seen as a prelude to a major drive to revitalise the country's ailing fishing industry.

Changes envisaged will provide for the establishment of a fishery bank to grant credit, an insurance scheme, and a 25-mile coastal limit for the exclusive use of small-scale fishermen.

It is proposed to keep deepsea vessels outside this limit. There will be stricter measures to stop poaching by foreign vessels. And more effort will be made to harness private sector resources for fishery development.

The new programme was instigated by Sri Lanka's Prime Minister, Mr. J. R. Jayawardene. He believes that fishing should be developed — because of what it can do for the economy, and to improve the lot of the fisherman.

In one project, the Ministry has negotiated for two million dollars in Norwegian aid for three nylon net factories to be set up in Devinuwara, Kalpitya and Kalkudah during 1978.

Under a west coast development project costing Rs.10 million (about £600,000) and funded by the Asian Development Bank, the Ministry is to set up yards to build GRP boats.

During 1978, 2,000 outboard motors are to be issued to individual fishermen. This will be the largest number in any one year. Until now, motors have been issued through co-operatives.

Meanwhile, a Presidential Commission of Enquiry is to report on alleged malpractices and wastage of public funds in Sri Lanka's public bodies involved in fisheries.

Mr. Perera claims it is necessary to find out what was wrong with previous development schemes so that a positive programme can be worked out.

The Ceylon Fisheries Corporation which had been formed to increase fish production had, he said, accounted for only one per cent of the country's total catch. Instead of making a contribution, it had run at an average loss of Rs.7 million a year over the past ten years.

An overdraft facility made available to the Corporation had been "frittered away" without showing any results.

Giving one example of corruption and mismanagement, he said that the Wennappuwa Fisheries Co-operative on the west coast had obtained a loan of Rs.1 million to buy fifteen three-and-a-half ton boats, each costing Rs.75,000. At the same time it had received further aid from the Socio Economic Development Centre.

But it had defaulted in repayments, and had applied for a further loan of Rs.5 m. to revive its activities. In the meantime, the Fisheries Department had only Rs.6 m. for developing fisheries in the country.

The bulk of the nets and engines made available for distribution throughout Sri Lanka had been diverted to the Wennappuwa area. But few of these nets and engines could now be found there.

Money where it is badly needed

THE Inter-American Bank and the European Economic Community are to provide a US$1,580,000 loan to help Honduran fishermen form co-operatives.

Fishing accounted for less than one per cent of the country's gross national product in 1975. The Honduran catch, according to the *FAO Yearbook* amounts to only 3,262 tons.

Some 4,300 fishermen eke out a bare existence. They sell their catches on the beach to middlemen, earning between $20 and $40 a month.

Honduras has no fishing terminals or markets for wholesale distribution. Even where some fishermen have been organised in co-operatives, there are no unloading or storage facilities.

The loan will help to finance a $3,410,000 programme by the Honduran Ministry of Natural Resources. It is designed to provide credit and marketing aid to small-scale fishermen in co-operatives.

Sub-projects

It is made up of four sub-projects: 1. Medium and short-term credits for the purchase of 20 *full*-equipped small boats, for construction of sheds, for storage space, and for refrigerated road vehicles. 2. For unloading facilities at Tela, La Ceiba, Trujillo-Puerto Castilla, Puerto Cortes and Coyolito. 3. A marketing sub-project in which two collection centres will be provided. 4. A technical co-operation sub-project.

ANCHOVY BROADSIDE— THE ADMIRAL STRIKES HIS COLOURS

VICE-ADMIRAL Alberto Indacochea has resigned from his post as President of Peru's fisheries research organisation. The reasons have not been made public. But his resignation follows a disagreement with Fisheries Minister, Vice-Admiral Francisco Mariategui over publication by the Institute in the local press of a document reporting the sharp drop in Peru's anchovy stocks.

This report, published on December 28, said: "To allow anchovy fishing, however restricted during 1978, would paralyse the recuperation process of the anchovy, with serious danger of an irreversible collapse."

It was issued by the Institute in response to reports in the press that the anchovy had returned. Fishermen said they had spotted new shoals of anchovy off the Peruvian coast.

According to the Institute, these are new generation anchovy and spawning appears to have been successful. But it warned that stocks were still dangerously low (around three million tons). It expects to re-evaluate the stocks and the results of the latest spawning sometime in March.

Admiral Mariategui told the Instituto del Mar that pronouncements on anchovy fishing and stocks should be made only by his ministry.

Admiral Indacochea had been President of the Instituto del Mar since January 1976.

Krill protein discovery!

ANTARCTIC KRILL may have greater importance as a protein source than even the most optimistic protagonists of the fishery anticipated.

A researcher at Norway's Institute of Technical Biochemistry has found that the small crustacean contains a previously unknown protein concentrate. This can be used for animal feeds and for various processed foods, says Trond Elligsen. He has also discovered that krill keeps better than was thought.

The krill Elligsen analysed came from the Norwegian Polar Institute expedition last year. Tests at sea showed that krill remained edible a week after it had been caught.

No oil problem in this fishery

THE OSLO newspaper *Aftenposten* recently carried a report from a correspondent in New Orleans praising the good relations between United States fishermen and oil operators in the Gulf of Mexico.

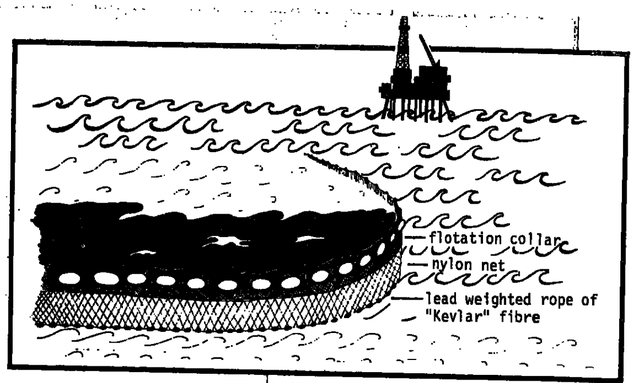
He wrote that the hundreds of production platforms set up there over the past 25 years have not harmed fishing. In fact, catches appear to have improved. And this includes oysters, which are considered to be particularly sensitive to pollution.

This relationship is contrasted with that between fishermen and oilmen in the North Sea. There fishing boats are barred from large areas around the platforms.

In the Gulf of Mexico, reported the correspondent, fishermen even tie their boats to the platforms while fishing.

It is now being recognised that large steel structures on major grounds do attract concentrations of fish. Despite this, fishermen in the North Sea are constantly complaining about inconveniences caused by oil activities.

AN OIL SPILL BOOM THAT REALLY WORKS



THE NORWEGIAN boom which helped contain the major oil spill from the North Ekofisk field blow out last year is now on the market. Made by the Bergen-based company A/S NOFI, the boom proved to be the only one of its kind able to operate in the sea conditions around the oilfield at the time

When all other attempts to contain the spill failed, the new boom was brought into use. With its help, a two milometre long slick was quickly contained.

The boom net hangs upright in the sea down to about two metres. It is supported by inflated PVC buoys and is backed to a depth of one metre by an opaque vinyl-coated skirt.

Its successful performance in heavy seas is largely attributed to the use of a strong but lightweight cable made of Du Pont's "Kevlar" 29 fibre. This cable is the keel rope forming the base of the net.

Problem solved

Two earlier booms made by NOFI failed because of the excessive weight imposed of iron chain and steel hawsers used to keep the nets upright. The problem was solved by substituting a 60-ton break strength, eight-strand keel rope of "Kevlar" lead weighted for the right degree of flotation.

This dramatically changed the handling characteristics of the boom, allowing an excellent dynamic response to wave movement. Water and oil were prevented from crossing the freeboard in waves as high as three metres.

The added flexibility also allowed the skipper of the towing vessel to employ purse seining technique, using powerful side-thrusters, to trap and hold the oil.

Within hours of the Ekofisk incident, the equipment was awarded certification by the Norwegian Pollution Control Agency. Orders totalling more than 4,000 metres have been received.

British start krill study

AT THE END of Febru Antarctic Treaty membe nations began a meeting i Canberra, Australia. The are discussing a draf convention for the con servation of the living resources of the area, wi this will be available fo signing by non-membe nations.

It may take some time reach agreement on a dra convention. But Dr. Richar Laws, director of th Cambridge-based British An tarctic Survey, feels that th investigation of all aspects o exploitation of Antarctic cru tures should begin witho delay.

Difficult

Once a fishery builds up stocks such as krill, he told FI correspondent Robin Burton will be difficult to impos limitations.

The BAS has already started an offshore biological pr gramme. Based on Sou Georgia, this will include studies of plankton, krill, fish seals and cephalopods.

The ship involved in the BA side of the programme is th research vessel *John Biscoe*. Although not specially built f biological studies, she has bee used for working grabs an trawls. And she is soon to b further adapted for offshor research.

South Georgia

She will work in co laboration with South Africa and West German research vessels. Her facilities will be supplemented by others a South Georgia and Signy Island.

In addition to krill and its environment, marine resources to be studied will include Southern Ocean fin fish mainly *Notothenia rossii*. They will be observed to determine just how they function as krill predators, how abundant they are, where they live, and how fast they grow.

South Yemen

Continued from Page 57

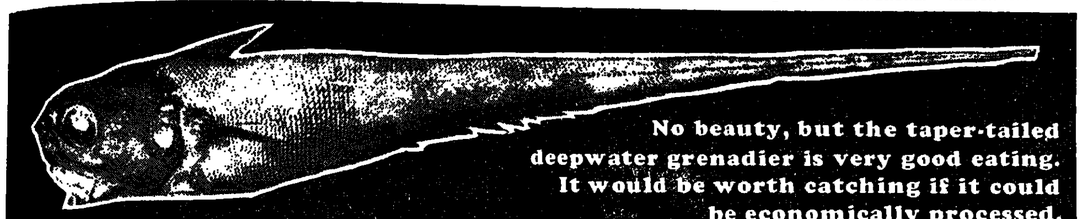
merely "rubber stamp" directives, the manager told me how they had recently overruled a recommendation to buy certain outboard engines, insisting on purchasing those of their own choice.

Fishermen members of the co-op are allowed to take one kilo of a catch for family use. The catch generally is sold fresh locally by the Corporation, any left over being salted. Ice is available for storage but not yet for fishermen to take to sea. The Shuqra co-op catch in 1976 was about 2,500 tons. In 1977 it exceeded 4,000 tons.

A canning factory was built at Shuqra with Japanese help in 1976. It cans sardines and mackerel, thus making more profitable use of local catches. It also provides industrial work for women. All the canning lines are entirely run by them. They also work in other parts of the factory and in the office.

One of the most striking features of life today in South Yemen is the liberation of women. The yashmak and purdah are things of the past in Aden and the urban centres. The girls and women dress in western-type clothes, move freely and on their own about the streets and work with the men.

Next month: Cyclic Oil will outline the problems facing South Yemen's fisheries and plans for the future.



No beauty, but the taper-tailed deepwater grenadier is very good eating. It would be worth catching if it could be economically processed.

FRENCH PROCESS GRENADIERS

THE DEEPWATER grenadier or rattail is being processed in France by a German Baader machine combination.

A type 150 filleter has been adapted to accept the tapering body of the fish *(Macrurus rupestris)*, which can measure up to one metre long (the average length is 50 to 80 cm.).

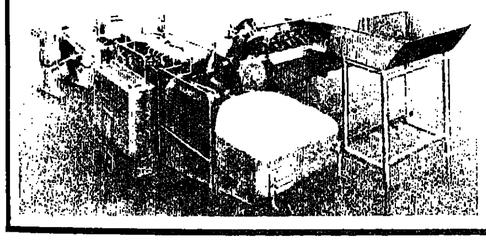
As the tail is not used in fillet production, it is removed by an additional cutting knife.

Grenadiers can be processed, heads on, at up to 40 a minute. The fish are skinned by a Baader 47, and fillet yield is about 37 per cent. of gutted weight. Only two men are required for the whole operation.

Another species of grenadier *(Macruronus novae zelandiae)*, caught mainly in New Zealand and Antarctic waters, can be processed by a Baader 181 filleting machine. Heads and tails are removed before the fish are handled.

Other species, including the Atlantic *Macrurus berglax*, have not been processed because of their bone structure.

The unattractive grenadier has not yet become popular in Western Europe. It has so far only been caught in quantity by the USSR and Eastern European nations.



This Baader type 150 filleter can be adapted to handle about 40 grenadiers a minute.

Russians show how they tranship hake

WHEN the Russian bottom fish processing ship *Sulak* called at Seattle, Washington, American visitors were particularly interested in the equipment and techniques she used to transfer fish from her catcher vessels.

This ship is supplied by medium-size trawlers 48 metres long. On the Pacific hake grounds, reported the North-west and Alaska Center of the US National Marine Fisheries Center, these trawlers come alongside the 174 metres long mother ship.

Then a rectangular steel frame (from which the cod-end of a trawl net is suspended) is lowered and fastened alongside the trawler in suspension from its deck.

Into cod-end

Hake are transferred from deck to net using a seawater pump and hose. These wash the fish gently over the side, up to a maximum of about two tons in the cod-end at one time.

This is then lifted to the deck of the factory ship and emptied directly into a tank of slush ice.

The NMFS notes that, although the method should minimise bruising and physical damage to the flesh, the Russians reported that only about half the fish transferred could be used for filleting.

This is done in a mechanised process line with Baader 190 filleters and 47 skinners. The hake fillets are spray-washed on a belt, inspected over a bright light, packed in waxed cartons 8.5 kilos weight, and frozen for 70 minutes in plate freezers.

"The colour and appearance of the frozen fillets we saw were excellent," said the NMFS visitors.

Omega for Australia

THE Australian Government has announced that an Omega navigation transmitter will be built in Gippsland, Victoria.

Omega has been in limited operation for nearly 10 years and only the Australian system is needed to complete the network.

Australia has no Loran or Decca navigator systems that fishermen can use.

SHRIMP RECORD

UNITED States Pacific Coast shrimp landings have reached a new record level. They exceeded the 1976 total of 174.9 million lb.

In 1976, record landings were made in Alaska with 129 m. lb. which was 28.5 per cent above the yearly average from 1971 through 1975.

Oregon landings of 25.4 m. lb. were nearly 30 per cent up.

international fish market

This advertisement section is reserved for fish merchants, importers and exporters of fish and marine products.

Please contact: Linda Sheldrake, Classified Advertisement Department, FISHING NEWS INTERNATIONAL, 110 Fleet Street, London EC4A 2JL, England. Tel. 01-353 6961 Telex 21977 Sysmag.

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